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REPORT OF THE

BUREAU OF COMMERCIAL FISHERIES

FOR THE CALENDAR YEAR **1961**

United States Department of the Interior
Fish and Wildlife Service
Bureau of Commercial Fisheries

REPORT OF THE
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FOR THE
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UNITED STATES DEPARTMENT OF THE INTERIOR
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UNITED STATES DEPARTMENT OF THE INTERIOR

FISH AND WILDLIFE SERVICE

BUREAU OF COMMERCIAL FISHERIES

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Report of the Bureau of Commercial Fisheries for the Calendar Year 1961

This is the fifth report of the Bureau of Commercial Fisheries, an agency of the U.S. Department of the Interior's Fish and Wildlife Service. Section 9(a) of the Fish and Wildlife Act of 1956 requires that the Bureau make such a report annually in order to record the progress of its activities and make an account of administrative actions.

During the calendar year 1961, the Bureau continued its efforts to provide the research and services that will assist the Nation to utilize fully and wisely its fishery resources. These efforts cover a wide spectrum of activities, from basic research in such fields as fishery biology or fish oil technology to such practical applications as demonstrations of fish cookery in schools or the dissemination of news of the daily prices for fish landed in our principal ports.

This annual report serves as a summary of the principal activities of the Bureau during 1961; consequently it touches but briefly on phases of biological, economic, engineering, oceanographic, and technological research. It also discusses briefly the many service programs, such as those involved in fishery products inspection, fishery market promotion, market news reporting, statistics collection, vessel loans, and vessel safety promotion.

As in the previous 4 years, the Bureau continued to make steady progress toward its goal of providing the fishing industry and the Nation the maximum assistance in maintaining a thriving fishing industry.

Condition and Trends of the Fisheries

The commercial fisheries of the United States in 1961 yielded a catch of 5.2 billion pounds—the Nation's second largest on record

(Appendix A). Fishermen received about $364 million for the catch—$10 million more than in the previous year but about $9 million less than the record amount of $373 million received in 1958. Total landings in 1961 were 0.3 billion pounds more than in 1960 but were about 0.1 billion pounds less than the 1956 record catch of 5.3 billion pounds. Record catches of menhaden and king crabs and substantial gains in the landings of Pacific salmon, tuna, and mackerel accounted for the increase in volume of the 1961 catch. There were sharp declines in landings of shrimp and Alaska and Maine herring.

The Atlantic Coast States accounted for 47 percent of the catch, followed by the Gulf States with 27 percent; the Pacific Coast States, including Hawaii, 23 percent; and the Great Lakes and Mississippi River States, 3 percent. San Pedro, Calif.,—with landings of 416 million pounds, valued at $36 million—was again the principal U.S. fishing port in both volume and value. Other leading ports in order of the volume of fish caught were Pascagoula, Miss.; Lewes, Del.; Reedville, Va.; Cameron, La.; and Empire, La. New Bedford, Mass., was second with respect to value of the catch, with landings valued at nearly $15 million.

Approximately 8 percent of the catch was taken on the high seas off foreign coasts. Landings from international waters were principally ocean perch and haddock taken off the east coast of Canada, shrimp off the east coast of Mexico, tuna off the Pacific coast of Central and South America, and troll-caught bottomfish and halibut off British Columbia.

Of the total volume of fish caught in 1961, about 47 percent was used directly in the manufacture of industrial products—principally meal and oil—and for bait. Thirty percent was marketed fresh or frozen, and 21 percent was canned. Somewhat less than 2 percent was cured. Besides whole fish used for reduction, about 550 million pounds of fillet and cannery waste were also manufactured into oil and meal. Therefore, about 56 percent of the total catch was used to produce meal and oil and for bait.

Imports provided over 44 percent of the total U.S. supply of fishery products in 1961. Nearly 44 percent of the supply of edible fishery products received during the year came from imports, while nearly 45 percent of the industrial fishery products were obtained from foreign countries. The 1961 imports of edible fishery products were 1.06 billion pounds—only slightly below the record 1.11 billion pounds received in 1959 and almost as much as the 1.07 billion pounds received in 1960. The rapid growth in imports of fishery products is indicated by the fact that in 1950 only one-fourth of the domestic supply of fishery products came from foreign countries and not until

1957 did imports account for one-third of the supply. In contrast, exports declined substantially during 1961, largely as a result of reduced export trade in canned salmon, sardines, shrimp, squid, and fish oils.

The per capita consumption of fishery products in the United States was 10.7 pounds in 1961—an increase of one-half pound over the previous year. Consumption of canned tuna and fresh and frozen groundfish fillets, sticks, and portions was at record levels. Consumption of shrimp declined because of the small catch. There was no change evident in the consumption of cured products.

Some of the highlights of the fisheries in 1961 were:

1. Menhaden continued to rank first in volume with a record catch of 2.3 billion pounds—45 percent of the total catch of all species taken by U.S. fishermen.

2. Salmon yielded a catch of 310 million pounds valued at $52 million. The catch was 75 million pounds larger than in 1960, but was still 481 million pounds less than the record landings in 1936. Salmon was the most valuable item taken by domestic fishermen in 1961, replacing shrimp, which had held first place since 1951.

3. The U.S. catch of shrimp was only 175 million pounds (heads-on weight). This was 30 percent less than in 1960 and 93 million pounds less than the record 268 million pounds taken in 1954. The decline occurred in the South Atlantic and Gulf States where a failure of brown and white species of shrimp to appear in normal quantities was a near disaster to the fishery. The catch for these States amounted to 153 million pounds, which was 84 million pounds, or 35 percent, less than in 1960 and the smallest since 1940. The catch of shrimp in Alaska was more than double that in 1960, and production in other Pacific Coast States remained relatively stable.

4. Maine landings of herring used principally for canning sardines was only 54 million pounds—a decline of 98 million pounds compared with the previous year. In Alaska, where herring are used for manufacture into meal and oil, the catch was only 49 million pounds—29 million pounds less than in the previous year.

5. The Pacific sardine fishery continued at a low level. The catch was only 43 million pounds—15 million pounds less than in 1960 and less than 3 percent of the record 1.5 billion pounds taken in 1936. The pack of canned sardines was the fourth smallest since World War I.

6. The Alaska catch of king crabs expanded greatly during the year, yielding a catch of 43 million pounds—over 14 million pounds more than in 1960.

7. Louisiana, with a catch of 643 million pounds, led all other States in volume in 1961. The catch, however, was only about a third of the

alltime record State landings, which occurred in California in 1936 when 1.76 billion pounds of fish and shellfish were landed.

8. The 15.8-million standard case pack of canned tuna was the largest in history. The 1961 U.S. catch of tuna (326 million pounds) was 28 million pounds greater than the 1960 catch and the largest since 1956. Imports of fresh and frozen tuna and cooked loins, round weight basis, amounted to 243 million pounds—9 percent less than in 1960.

9. Production of fish sticks and portions established a new record, 130 million pounds—16 million pounds more than in the previous year. Expansion of the industry, however, has not affected the domestic catch of groundfish since imported blocks of groundfish fillets are used almost entirely in the manufacture of sticks and portions.

10. Menhaden meal accounted for over 80 percent of the record 311,000 tons of fish meal manufactured in 1961.

Developments in the Fisheries

Domestic Fisheries

The fisheries are continually undergoing change. This is typical of any dynamic industry. Such factors as fluctuating fish supplies, new technological developments, changes in marketing and merchandising techniques, and the public's changing food preferences, all affect the industry. Some of these effects may be immediate and dramatic, and others gradual and less noticeable. During the past year, significant changes occurred in the domestic fisheries. Adjustment to these changes has not always been an easy task for the commercial fishing industry. Some of the fisheries undergoing changes are discussed here.

Tuna

The domestic tuna industry, stimulated by the success of converted seiners and the ever-rising consumption of canned tuna, continued to display its spectacular economic progress in 1961. The California tuna fleet, changed by conversion from a predominantly clipper fleet fishing with hook and line to a purse seine fleet fishing with huge nets, again took large quantities of yellowfin tuna. There were indications, however, that this species was being overfished, and considerable effort was devoted to fishing for skipjack tuna by the purse seine fleet. In 1961 the Inter-American Tropical Tuna Commission recommended that a limit be placed on the catch of yellowfin in order to maintain

stocks at the maximum sustainable yield level. Legislation providing a legal basis for imposing a catch quota was introduced into the U.S. Congress and at the end of the year was still being reviewed. The Commission recommended that in 1962 an overall catch quota of 83,000 tons be placed on the fishery in the entire convention area. In 1960 the catch of yellowfin was 117,000 tons and in 1961, 120,000 tons. An enforced quota of 83,000 tons should make it possible to maintain the resource at a high level of productivity.

Salmon

Salmon displaced shrimp as the most valuable species taken by domestic fishermen in 1961. Although the 1961 catch was greater than in 1960, it was still 61 percent less than the record landed in 1936. Most of the increase occurred in Alaska. The catch of red salmon in Western Alaska was the best since 1948, and the pink salmon catch in the northern waters of Southeastern Alaska was the largest since 1951. Prince William Sound had an excellent run of pink salmon which had not been expected. The Puget Sound catch was disappointing due to poor runs of red and pink salmon to the Fraser River.

Menhaden

The record menhaden catch in 1961 was the largest annual landings of a single item in the history of the U.S. fisheries. The 1959 menhaden catch had previously held this record. Receipts for 1961 were 297 million pounds above those of the previous year and smashed the 1959 record by 112 million pounds. This was the 16th consecutive year in which menhaden was the leading species. Although landings were down in New England, they increased in all other areas where the fishery is prosecuted. The tremendous expansion of menhaden operations in the Gulf of Mexico caused the total catch of all species from these waters to increase from only 4 percent of the U.S. catch in 1936 to 27 percent in 1960.

North Atlantic Groundfish

Despite a small overall increase in catch, the North Atlantic groundfish fishery continued in the depressed condition that has characterized this industry for the past decade. The combined 1961 catch of cod, haddock, hake, pollock, cusk, and ocean perch was 3 percent more than in 1960. Landings of haddock increased slightly, while receipts of ocean perch were somewhat less. Prices remained low, and 68 per-

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cent of the supply of groundfish fillets was derived from imports. Haddock prospects for 1962 appear dim. Bureau scientists predict poor scrod landings in 1962 because of poor year class recruitment.

Herring

The herring fishery of the Atlantic Coast and also that of Alaska had a bad year financially. Maine landings of herring decreased drastically over those of the previous year. Imports of herring into Maine from Canada also declined. There was no clear-cut explanation for the shortage of the small Atlantic herring that are used for sardines. The sardine industry was staggered by the shortest pack in 23 years. As a result of scarce supply, the Maine State Legislature extended the fishing season an additional 5½ months. Fish remained fairly scarce, so the extended season had little effect. In Alaska the catch was the lowest since 1954 and one of the half-dozen smallest catches since the early 1920's when there was a large expansion in the Alaska herring-reduction industry.

Sardines

The 1961 sardine season was one of the poorest on record. Canners were anxious for fish and prices were stable, but sardines failed to appear in volume off southern California. Fishermen reported the fish to be wild, making it impossible to take large catches on single sets.

Halibut

Receipts of halibut landed by U.S. fishermen at West Coast ports showed a slight increase over 1960. Canadians took less fish than in the previous year. The U.S.-Canadian North Pacific landings of 93 million pounds (round weight) were 3 million less than the 1960 record production.

Mackerel

The catch of jack mackerel increased over the 1960 catch by 31 percent and Pacific mackerel by 19 percent. Mackerel was relatively plentiful, although fishermen found them in waters well offshore rather than in the customary inshore areas. Canners found it necessary to set catch quotas during virtually the entire season.

Oysters

Production of oysters amounted to only 62 million pounds of meats—2 million pounds more than in 1960 but only 41 percent of the 1908 production of 152 million pounds. Production was down in the New England, Chesapeake, and South Atlantic States. The harvest increased in the Gulf States, and a further heartening development was the increased harvest in New Jersey where a few years previously the fishery had nearly been wiped out by disease. It is hoped that similar comebacks can be realized in other areas where present oyster production is at a low level.

Crabs

The catch of crabs improved slightly. The Alaska king crab was responsible for the gain. The 1961 catch of these crabs and the canned pack were both 51 percent greater than in 1960. The development of the king crab fishery has been truly remarkable.

Inland Fisheries

The 1961 U.S. catch in the Great Lakes and Mississippi River area was about the same as in 1960. The more desirable food fish, however, continued to decline, and for a livelihood the industry was forced to rely increasingly on species often considered as the less desirable rough fish. The trend toward the development of industrial fisheries to offset losses in food fisheries continued.

Federal Legislation

Each year the Congress considers bills that propose actions that would affect the fishing industry. As with most bills submitted to the Congress, only a few are finally enacted into law. During calendar year 1961 four bills pertaining to fishery matters were passed by the Congress. A brief description of each act follows.

The Act of August 30, 1961, concerns documentation and inspection of vessels of the United States. It provides that a vessel licensed to engage in the fishery shall not be deemed to be used in employment for which it was not licensed and shall not be considered as engaged in the transportation of freight for hire solely because such vessel occasionally takes on board on the high seas and transports without a monetary consideration to a port of the United States the catch of another U.S. fishing vessel.

The second act, signed on August 30, 1961, authorizes the Secretary of the Interior to construct at Milford, Conn., a research center for shellfisheries production and there to conduct a research program and training school. The Secretary is authorized to acquire such real property as may be necessary for the purpose. The act provides that the research center shall consist of research facilities, a pilot hatchery including rearing tanks and ponds, and a training school. The research center is to be used to perform basic research on the physiology and ecology of commercial shellfish; to develop hatchery methods for cultivation of mollusks, including the development of principles that can be applied in the use of artificial and natural salt-water ponds for shellfish culture; and to train persons in the most advanced methods of shellfish culture.

A sum not to exceed $1,325,000 is appropriated to carry out the provisions of the act.

Two acts were signed on September 13, 1961. The first is for the purpose of facilitating administration of and protecting the interest of the Government in the fishery loan fund. It authorizes the Secretary to administer, complete, recondition, reconstruct, renovate, repair, maintain, operate, charter, assign or sell any vessel, plant, or other property acquired and arising out of any fishery loan. For the aforesaid purposes, any of the applicable funds in each particular instance are authorized.

The second act signed on September 13, 1961, permits the landings of catches of fresh fish from foreign-flag vessels not over 50 feet long in any port of the Virgin Islands of the United States as long as the fish are sold or transferred for immediate consumption and not to an agent, representative, or employee of a cannery, freezer, or other processor. It does not preclude the freezing, smoking, or other processing of such fresh fish by the ultimate consumer thereof. The act authorizes the forfeiture of such fish not sold or transferred under such conditions and the payment of a fine of $1,000 by anyone retaining, selling, transferring, receiving, and purchasing such fish, in addition to any other penalty provided in the law.

The Secretary of the Treasury is authorized to issue any regulations he deems necessary for the enforcement of the provisions of the act.

The four acts described above are listed in Appendix B.

International Developments

Developments in foreign fisheries often create problems for the U.S. fishing industry. It is the Bureau's responsibility to assist in

solving these problems. This assistance may be in the form of reporting foreign fishery developments to the U.S. industry so that its members can better meet changed conditions; of enforcing international treaties with respect to resources; or of participating in international meetings that consider the conservation and wise utilization of marine fishery resources or that negotiate international trade agreements to protect or broaden our markets.

Foreign fishery developments have made problems for the U.S. fishing industry in recent years. The Bureau has expended considerable effort to assist the industry to cope with these problems.

Developments in Foreign Fisheries

At the turn of the last decade, several countries were placing great emphasis on fishery expansion. Long-range catch goals that had been previously established 5 years or so in advance were being achieved. In 1961, for the first time, the fishery production of the Soviet Union, Peru, and Communist China surpassed that of the United States. In addition many other developed and developing countries had made rapid strides in expanding marine fishery production. Soviet, Polish, and Japanese fishing craft were operating closer to Alaskan and New England shores. Many nations have placed increased emphasis on harvesting marine fishery resources, often at great distances from home bases. This greater exploitation has pointed out the need for more adequate conservation measures.

Increased world production of fishery commodities has resulted in keen competition for the U.S. fishing industry, both in domestic and in world markets.

Reporting on Foreign Operations

The Bureau, in collaboration with the Department of State, provided industry and Government leaders with information necessary to cope with marketing and conservation matters. During the year expanded coverage of the fishing activities of foreign countries was obtained, especially with regard to the fishery development plans of many countries. The number of fishery attachés assigned to U.S. embassies was increased to three by the establishment of an attaché post in Copenhagen. Through the creation of this post, European fishery reporting improved tremendously during the year and now is achieved on a regional basis as it is for Latin America through the fishery attaché in Mexico City; the fishery attaché in Tokyo reports exclusively on the fisheries of Japan. Because of the new post at Copenhagen, U.S. representation has been bolstered in organizations such as the

Fisheries Committee of the Organization for Economic Cooperation and Development.

Since April 1961 the Bureau has issued monthly briefs to inform members of industry and Government on Soviet fishery developments, especially in the Bering Sea. With African countries rapidly expanding their fisheries and Japan and other countries expanding theirs to the waters off Central Africa, a new series of monthly briefs was started to cover developments in that area.

International Law Enforcement and Surveillance

Regional enforcement activities in Alaska, the Pacific Northwest, and New England carried out the responsibilities required by international treaties. Because of the continued expansion of fishing activities by foreign vessels operating off the coasts of the United States, particularly Alaska and the New England States, the Bureau increased its efforts during 1961 to maintain surveillance over these operations for the purpose of determining their scope and possible effects upon those fishery resources historically exploited or potentially subject to exploitation by American fishermen. It appears that the Soviet Union fishing fleets in the eastern North Pacific Ocean and the Northwest Atlantic Ocean will continue their large-scale expansion, so evident during the past 2 years. While the fishing methods used by the Soviet vessels on Georges Bank appear to follow the regulations prescribed by the International Commission for the Northwest Atlantic Fisheries (ICNAF), the Bureau is concerned about possible increased fishing of the haddock stocks, which have been fished almost to productive capacity by U.S. fishermen.

International Meetings

Bureau officials participated at numerous international fishery meetings to guide rational exploitation of valuable oceanic species and, simultaneously, to protect the rights of U.S. fishermen. At the meetings they worked to implement carefully determined positions protecting the salmon, halibut, tuna, and fur seal resources of the Pacific Ocean, as well as the cod, haddock, flounder, and scallop resources in the Northwest Atlantic. International commissions holding meetings where fishery issues were resolved included: the International Pacific Salmon Fisheries Commission; the International Commission for the Northwest Atlantic Fisheries; the Inter-American Tropical Tuna Commission; the International Pacific Halibut Commission; the International North Pacific Fisheries Commission; the North Pacific Fur Seal Commission; and the International Whaling Commission.

Fisheries advisers from the Bureau were on the U.S. delegation to the 11th Food and Agriculture Organization of the United Nations (FAO) Conference, held in Rome from October 30 to November 24, 1961. Fishery programs were formulated to improve the economic condition of the fisheries of both developed and developing nations. Among many actions taken of importance to the United States were those dealing with (1) the fishery aspects of intergovernmental oceanographic programs; (2) test programs to be conducted by FAO to increase world consumption of fish protein concentrates; (3) the establishment of a Regional Fisheries Commission for Western Africa; (4) the establishment of a Regional Fisheries Advisory Commission for the Southwest Atlantic; (5) and the establishment of an FAO Advisory Committee on Marine Resources, including provisions for the advice of technologists, economists, and biologists in the Fisheries Division. Expansion of the FAO's program to combat the harmful effects of the increased use of pesticides was also discussed.

The Bureau sent representatives to the 1960–61 tariff negotiations held in Geneva under the General Agreement on Tariffs and Trade (GATT). The United States and other members of GATT entered into tariff negotiations with members of the European Common Market. The U.S. delegation sought and achieved tariff concessions benefiting the sale of certain U.S. fishery products in European markets.

Accomplishments and Operations

Principal Accomplishments

In 1961 the Bureau's activities were more numerous than ever before. A wider scope of activities and accelerated programs in certain areas were responsible for the increase. As a result there have been more accomplishments than in previous years.

North Pacific

Whale resource management and harvest.—In the North Pacific area, licenses were issued to whaling companies and their operations were inspected. The three commercial companies operating in California and Oregon took a total of 344 whales. This is the largest number harvested since the rebirth of the whaling industry along the Pacific Coast in 1956. The Bureau also carried on whale research and participated in the activities of the International Whaling Commission.

Fur seal resource management and research.—The Bureau continued with the administration of the Pribilof Islands and the fur seal resource in accordance with the provisions of the Alaska Statehood Act. Secretarial services were supplied to the North Pacific Fur Seal Commission.

During the fiscal year 1961 two construction contracts were awarded. One is for a combination powerhouse and cold storage building on St. George Island, complete with diesel electric generating units and refrigeration equipment. The new generating units will provide prime electrical power for the Island. The other contract is for a diesel fuel oil storage tank on St. Paul Island. This tank will facilitate delivery of fuel oil to the Island by means of a cargo line for ship-to-shore delivery.

The Pribilof Island fur seal herds were caculated to have about 1,500,000 animals. Although this number represents an alltime peak, hookworm infection continues to cause a heavy mortality among fur seal pups. It has recently been discovered that the infection is carried by adult animals during their extended ocean migrations; therefore, it is apparent that efforts to control the infection by disinfecting the rookeries will not be effective.

Studies of the ocean migrations and feeding habits of fur seal show that in northern waters herring, capelin, Walleye pollock, and sand lance are the principal food items, while near the southern limit of their range off California, anchovies, saury, hake, and squid form 90 percent of the fur seal diet.

Fur seal harvest.—The 1961 take of fur seals on the Pribilofs was the largest harvest since 1956. On St. Paul Island, 67,169 male seals were taken from July 2 through August 15, while 10,495 females were taken in continuation of the program inaugurated in 1956 to reduce the herds through the harvest of female seals as well as males. The take of seals on St. George Island during a comparable period yielded 15,028 males and 3,623 females, making a total harvest on both Islands of 82,197 males and 14,118 females. Under the terms of the Interim Convention on Conservation of North Pacific Fur Seals, 15 percent of the sealskins taken, plus 375 additional skins, respectively, were delivered to the Governments of Canada and Japan.

At two public auctions held in the spring and fall of 1961, 53,802 sealskins were sold for the account of the United States. Gross sales of these skins totaled $4,142,378 and netted the U.S. Treasury $2,574,933. Special sales of 4,243 sealskins brought a gross of $44,176.

Exploratory fishing.—The Bureau's exploratory fishing vessel *John N. Cobb* delineated several trawlable localities off the coast of Oregon within rocky areas normally avoided by commercial fishermen. Tech-

niques developed during the 1960 explorations on "bad bottom" areas off the coast of Washington were used. The trawlable bottom covered some 100 square miles at depths ranging from 75 to 200 fathoms. Good catches of Dover sole, sablefish, and red rockfish were taken in the area off Newport, Oreg. In one of the smaller areas, 40,000 pounds of Pacific ocean perch were caught in 20 minutes of trawling. This was the largest catch ever made by the *John N. Cobb* in over 10 years of exploratory work.

Utilizing the chartered vessel *Tordenskjold*, the Alaska exploratory operations yielded good catches of Dungeness crabs at depths of 20 to 50 fathoms in offshore waters between Lituya and Icy Bay. Commercial fishing on these previously unknown stocks commenced soon after their presence was determined.

Emergency salmon research programs.—Efforts to restore and protect valuable runs of Pacific salmons increased during the past year. A 2-year emergency research program in Alaska is nearing completion. The major objective is to get information necessary for the successful renegotiation in 1963 of the International Convention for the High Seas Fisheries of the North Pacific Ocean, to which the United States, Canada, and Japan are parties. If any one of the three signatory nations does not wish to renegotiate, the convention will end in 1964. The research program is concentrated on the valuable Bristol Bay red salmon runs, which are not fully protected by the terms of the convention. Research has provided increased knowledge of the optimum spawning escapements required to support the red salmon runs in rivers flowing into Bristol Bay. There is increasing evidence that the ability of lakes and streams to support populations of young salmon, rather than the extent of the spawning areas, may be the limiting factor in red salmon production. The studies have shown that red salmon spawn to a depth of 100 feet in some lakes and that the fish-carrying capacity of the lakes varies widely. Ability to predict the size of the salmon runs has improved with the expansion of tagging and sampling programs in the central North Pacific and Gulf of Alaska.

In the Columbia River Basin, the proposed development of the Middle Snake River called for an immediate and intensive effort to find answers to the special problems of fish resource conservation and development posed by the construction of high dams. Essential answers must be found by 1964 to guide the future development of this important salmon producing tributary. The runs that pass through this section of the Middle Snake River are so large a proportion of the spawning escapement in the Columbia River upstream from Bonneville Dam that any project affecting them will have an effect

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upon the entire resource. A short-range emergency research program to find better means of fish passage at high dams has been initiated. With the cooperation of the State fisheries agencies of California, Idaho, Oregon, and Washington, studies of juvenile salmon behavior are in progress on several large impoundments. "Gulpers" and "skimmers" are being developed as a means of collecting the downstream migrants above the dams. Louvers and electrical fields show promise of deflecting migrants to safe avenues of passage. In studies of endurance, steelhead trout and salmon have ascended an experimental fishway for more than 1,000 feet, and one sockeye salmon for more than a mile. Modification of conventional fishway design, a result of experiments in the fish passage laboratory, has saved thousands of dollars in the construction of fishways at Ice Harbor Dam. Further savings will accrue in the construction of fishways at other dams on the lower Snake River.

The Columbia River Fishery Development Program.—In 1961 this program began its 13th year. Operation and maintenance of hatcheries, screens, fishways, and stream-improvement projects continued. Grays River hatchery, the last of the 21 hatcheries constructed under the program, was accepted and placed in operational status by the Washington State Department of Fisheries. Final detailed plans for an evaluation of the hatcheries were prepared. The program is to be initiated in 1962 with the marking by excision of certain fins of several million juvenile salmon. Recovery of marked adult salmon from sport and commercial fisheries and at the hatcheries will provide data upon which production from the hatcheries and contribution to the fisheries may be determined. During the year over 67 million eggs from fall chinook salmon and nearly 33 million eggs from silver salmon were taken at program hatcheries. Young fish released from the hatcheries included 51 million chinook salmon and 12 million silver salmon which had been reared for approximately 1 year.

During the year 71 new screens were constructed and placed in operation at water diversions in the Salmon River basin in Idaho. Emplacement of such screens at points of irrigation diversions prevents entry, and subsequent loss, of young salmon and steelhead. A total of 131 screens have been constructed and now are in operation in Idaho.

The operational studies program, begun in 1960, continued. Several techniques showed promise for developing better methods of fish culture, controlling predators, and improving natural habitat for spawning. Evaluation of artificial impoundments continued, with construction of ponds and stocking of fish in Washington and Oregon. As a part of the study program, approximately 900,000 spring chinook

salmon eggs were planted in the gravel in the main stem of the Upper Selway River in Idaho, while another 700,000 eggs were planted in a tributary to the Selway River. The eggs were obtained from salmon trapped in the Salmon River in Idaho and from Carson Hatchery on the Wind River in Washington. These transplantations of eggs were made in an effort to produce spring chinook salmon runs in the Selway River.

The Shipperd Falls fishway on the Wind River in Washington was constructed several years ago under the auspices of the Columbia River program. Since then the numbers of fish passing this structure to upstream spawning grounds and to the Carson Hatchery of the U.S. Fish and Wildlife Service has increased each year. During 1961 over 4,000 salmon and steelhead ascended the ladder, thus giving demonstrative proof of its success in passing fish.

Proposed water-development projects were studied, and reports were prepared in which analyses of the probable effects of the projects upon fishery resources were made, along with recommendations for protection and maintenance of those resources. Thirty-four reports were prepared on major water projects for conservation of fish resources, and 54 projects were under investigation or review at the end of the year. In some instances, special studies were made of projects completed in prior years in order to analyze the success of facilities or measures that were recommended and adopted. In addition, technical services were supplied to construction agencies designing functional fish-passage facilities at new water-development projects and providing inspection services for the completed facilities.

California

Sardine population studies.—Recent investigations on the serology of the Pacific sardine in California-Mexican waters have shown that there is a genetically distinct stock in the Gulf of California. This is the third sardine subpopulation to be found in the eastern Pacific. Of the two subpopulations defined earlier, one occurs off southern California and the other off Baja California. The large subpopulation in the Gulf of California will probably contribute little or no fish to the present industry operating on the outer coasts.

Albacore abundance prediction.—Increased efficiency in the albacore fishery has resulted from a new program for forecasting albacore abundance. This forecast is made by the Bureau's Biological Laboratory at San Diego. A careful study of historical and current data on the occurrence of albacore in relation to sea surface temperature has revealed a high degree of correlation. In "cold" years albacore move farther south than usual, resulting in high catches south of the

border. Monthly and semimonthly maps of sea surface temperatures in the South Pacific are now being published for use by fishermen in determining the areas where albacore are most likely to be caught. Topographic information is also supplied on these maps, showing the occurrence of seamounts and banks where tuna are known to congregate for feeding.

Hawaii

Albacore subpopulations.—Blood samples from albacore caught in the eastern North Pacific have been compared serologically with samples from the Samoan longline fishery. Because of marked differences in blood types of these fish, biologists have concluded that the albacore from these South Pacific areas represent genetically isolated stocks. This means that the albacore in the northern hemisphere are from distinctly different subpopulations than those south of the Equator. It remains to be determined whether a single, oceanwide subpopulation exists in the southern hemisphere as is known to exist to the north of the Equator.

Skipjack predictions.—The Bureau's Biological Laboratory at Honolulu has developed a method for predicting the seasonal catch of skipjack for the Hawaiian Islands. The method is based upon the time of "zero" rate of temperature change of the ocean climate—the time and rate of warming and salinity change—occurring during late February and early March of each year. If the change occurs in February or before, then the coming season's catch of skipjack can be expected to be good. This relationship between the availability of skipjack in the fishing season and the time of critical change in environmental conditions in the preceding months was discovered in 1959 by the Laboratory staff in their study of the ocean climate around Hawaii. In that year a good fishing season was predicted and came to pass. In 1961 the method was again tested. The change took place earlier than ever before recorded, and so in March it was predicted that the 1961 fishing season for skipjack would be better than average. The June landings were the second highest on record for that area, and the landings for the year were 11 million pounds, which is about 1.7 million above average.

Drift bottle studies.—In a study of the ocean currents in the region of the Hawaiian Islands, approximately 8,000 drift bottles were released from the research vessel *Charles H. Gilbert.* About 5 percent of them have been recovered, mostly in the Hawaiian Islands. In a large number of instances, the bottles had been carried distances of over a hundred miles, at speeds of about 10 miles per day. One bottle traveled about 1,800 miles at a speed in excess of 27 miles per day.

Frequently, several bottles from a single release traveled a considerable distance to wash ashore close together at about the same time. Eleven of 40 bottles from one release in the western Pacific were reported found on Maiana Island in the Gilberts almost 300 miles away. This implies surprisingly little dispersion in the open ocean due to turbulent mixing and suggests the existence of a mechanism, such as convergence of the surface waters, which tends to keep the drift bottles together as they move with the currents. The returns provide evidence of seasonal variations in the surface currents near the Hawaiian Islands. In the winter the recoveries were from the releases south and west of the Islands; in the spring, the movement was generally to the north and west; and later in the year, the pattern showed a westerly movement, with a few recoveries from the south.

Gulf of Mexico

Midwater trawling explorations and gear research.—Midwater trawling explorations for sardinelike fishes in the Gulf of Mexico were continued by the Bureau's exploratory fishing vessel *Oregon.* Although vast numbers of midwater-schooling fishes were encountered, catches were erratic. Coincidental with these explorations, performance tests were made of experimental midwater trawl designs and various types of trawl doors, depressors, and elevators. Electronic instruments were designed and developed to record gear performance and fish behavior patterns. Of particular significance was the development of remote-controlled, underwater movie camera apparatus to record fish performance under conditions not suitable for scuba divers.

Shrimp explorations.—The *Oregon* also carried out shrimp explorations in areas of the Gulf of Mexico not fished by the commercial fleet. These explorations proved conclusively that the absence of shrimp from known grounds was caused by reduced stocks rather than a change of habitat of the common commercial species of shrimp.

Shrimp trawl gear tests.—In the course of underwater shrimp trawl studies on the Bureau's exploratory fishing vessel *George M. Bowers*, instruments for measuring significant mechanical parameters of shrimp trawl gear were designed and tested. These included a trawl door angle-of-attack indicator, a door-to-net leg angle indicator, a trawl and door spread indicator, and a towing warp angle indicator. These instruments, and others being developed, should be of tremendous help in future experiments on shrimp trawl mechanics.

Shrimp research.—The Bureau of Commercial Fisheries' shrimp research is centered at the Biological Laboratory, Galveston, Tex. The aim of this research is to determine the biological conditions

responsible for fluctuations in the number of shrimp available and the facility with which they can be caught. To accomplish this aim, knowledge must be acquired on the entire life of shrimp from egg to adult, on spawning and nursery areas, on shrimp movements, and on the physical and chemical conditions of the sea.

Through studies of shrimp biology, methods for distinguishing the larval forms of the different species have been developed. This is important because shrimp spawn offshore. After the egg hatches, the larvae undergo several transformations as they moult and grow. These young shrimp migrate to the coast and enter the protected estuaries where they grow rapidly. Three years ago, research was started to collect these postlarvae to determine how they vary in abundance from week to week and year to year. The numbers entering the estuaries in the spring of 1961 were very much less than in 1960. This suggests that to discover the causes of changes in survival more knowledge is needed of conditions in the offshore areas between the spawning grounds and the shore.

Simultaneous sampling of shrimp populations and water conditions on the Continental Shelf between the Rio Grande and the Mississippi Rivers was begun in 1961. The object of these studies is to discover how environmental conditions (temperature, salinity, and ocean currents) influence the survival of shrimp.

Variations in ocean currents may affect the success with which larvae move from the offshore spawning grounds to the estuaries. Once a month measurements are made of the speed and direction of currents at several depths at 60 locations on the Continental Shelf. Drift bottles are released to determine surface currents. Seabed drifters are used to study bottom currents. These are made of colored plastic and closely resemble a small umbrella. The handle tip slides along the bottom while the umbrella is towed by the current. They are caught by the shrimp fishermen in their nets, and the position of capture reported.

These studies require very exact measurements, and it will be several years before data on the annual variations in temperature, salinity, and currents can be accumulated and compared for their effects on shrimp.

The technique of staining shrimp with colored dyes has been an important development. Recapture on the fishing grounds of dyed shrimp released in the estuaries has proven that shrimp may migrate long distances, that these estuaries are necessary to the maintanance of the shrimp populations, and that this migration is a long and hazardous journey.

During fall 1961 the first successful release of stained shrimp at sea was accomplished. Live stained shrimp were lowered to the bottom in a large closed box. Scuba divers observed them leaving the box and burrowing into the soft bottom. For the first time actual measurements of growth and mortality rates on shrimp of known size at release were possible. Preliminary results with pink shrimp on the Tortugas and Sanibel grounds indicate rapid growth and high mortality. Similar experiments with brown and white shrimp are underway. Such studies should assist in determining what are the correct sizes for harvesting.

New sea-water facilities completed.—During the year a circulating sea-water system was completed at the main Laboratory at Galveston and a sea-water laboratory was constructed at East Lagoon. Studies of shrimp behavior and physiology are underway. Full knowledge of the effects of hydrographic conditions on shrimp depends upon laboratory experiments as well as field observations. Studies of artificial culture of shrimp will also be possible with these running sea-water systems, so that commercial quantities of shrimp may eventually be raised under controlled conditions. The new laboratory at East Lagoon will be used primarily to hold for experimental purposes shrimp, crab, and other shellfish and both larval and adult fish as well as numerous other marine animals.

Shrimp industry study completed.—The Bureau contracted with the University of Florida for a study on the economic utilization of shrimp vessels. During the past year the study was completed. The report presents an analysis of factors influencing productivity in the domestic industry and suggests corrective measures to strengthen the industry's position with respect to foreign competition.

Atlantic Coast

Calico scallop bed commercially productive.—The Bureau's chartered exploratory fishing vessel *Silver Bay* further delineated the calico scallop bed discovered in 1960 off the east coast of Florida and obtained information on the seasonal occurrence of this species. It was demonstrated that calico scallops are available in commercial quantities and that a year-round fishery is possible. This may be one of the largest scallop beds in the world. A 100-foot North Atlantic trawler with automatic shucking machines aboard was readied for harvesting this resource and sailed on its initial voyage in December.

Exploratory fishing off the Carolinas.—The *Silver Bay* also located promising fishing grounds off Cape Fear, N.C., and Charleston, S.C. Commercially significant catches of vermillion snapper, grouper, and

scup were made. As a result, a small fishery began off South Carolina.

Trawling for herring.—The Bureau's vessel *Delaware*, utilizing midwater trawls rigged with instrumentation similar to that employed by the *Oregon* in its operations in the Gulf of Mexico, carried out successful herring explorations off the New England coast. Good catches of herring were consistently made off the northern edge of Georges Bank. The methods and techniques for midwater trawling perfected during these exploratory fishing operations should be useful to the Maine sardine industry, particularly in years similar to the year 1961 when the fish were not available in inshore waters.

Polypropylene trawl net demonstrations.—To determine the effectiveness of trawls with various parts made of polypropylene, comparative fishing tests with trawls of this material and standard manila trawls were made by the Bureau's exploratory fishing vessel *Delaware*. Polypropylene trawls appeared to be more efficient than the standard manila trawls. This is probably attributable to both the buoyancy of the polypropylene top sections and ropes, which allows the headrope to rise higher, and the reduced water resistance, which allows the trawls to be dragged more easily.

Shellfish culture and predator control.—The Bureau's research program for the development of artificial culture of oysters and clams and the control of their enemies took major steps forward during 1961.

Scientists at the Bureau's Laboratory at Milford, Conn., have been engaged in this work. During the past year they have been studying methods for raising the microscopic plants that are the oyster's food. Artificial culture of oysters and clams will depend largely on supplying food to the larvae, juveniles, and adult bivalves: therefore finding the best, most easily handled, and cheapest foods is an important goal in the program. This research has been successful, and food can be grown in sufficient quantity to feed our experimental larvae and juveniles in the laboratory.

Work also began on the development of a processed food for bivalves. A dried product that can be stored satisfactorily until needed will be of great advantage. Through the freeze-drying technique, a food was produced that can be fed to clams and will cause growth comparable to that when fed natural foods.

Part of the research at Milford was on the control of diseases that are known to develop when oysters and clams are crowded together, as is necessary in artificial culture. Prophylactic treatments of antibiotics were found to effectively control these diseases.

Studies are being made to determine what makes a good cultch for oysters that are being cultured artificially. A clean, hard substance is needed for the attachment of the young oysters. The best and most commonly used is the old oyster shell, which, however, is scarce, odd

shaped, bulky, and heavy. The disadvantages of oyster shell become more important in artificial culture, for space and cost must be considered more closely. Many kinds of materials such as rubber, plastics, and cement have been tested. Compared with natural oyster shell, cement panels have proved the best.

At the Laboratory at Milford certain chemicals were found to control effectively oyster drills, and methods were developed for applying these chemicals to oyster beds. After controlled laboratory experiments, tests were made on several acres of natural oyster grounds. The chemicals, applied by broadcasting sand treated with these chemicals over the beds, will cause marked reductions in the number of predators. Experiments and tests are now underway to determine if the chemicals are accumulated by the oysters. It is known that these chemicals will not harm oysters or other marine life when used according to the methods developed at Milford. The question is: Can the oysters store the chemicals so they may not be safe human foods? The Bureau is working closely with the U.S. Food and Drug Administration to insure that when the method is recommended for use by the oyster industry, the oysters will be safe.

Woods Hole Aquarium.—The aquarium at Woods Hole was completed and opened to the public during the summer. More than 200,000 persons visited it in 1961. Throughout the year it also functions as an aquarium for experiments on marine fishes. Construction of a maintenance building was also completed.

Economic studies contracted to Boston College.—In the interest of the fishing industry, the Bureau contracted with Boston College for several economic studies. One of them deals with the basic differences that account for the competitive advantage enjoyed by the Canadian groundfish industry over the domestic industry. Results of the study show the differences to be the greater proximity of the Canadian fishermen to the more productive Northwest Atlantic grounds, vertical integration of the Canadian industry, and a large Canadian labor pool. In addition to making cost comparisons, the study also contains an analysis of the groundfish resources of the Northwest Atlantic with special reference to vessel productivity.

The economic factors affecting the demand for New England cod and haddock have also been studied by Boston College. The report shows that the demand for haddock is quite elastic although the degree of elasticity has declined somewhat in recent years because of the increasing importance of the fresh market to the domestic industry. Since the wholesale price for haddock is relatively insensitive to changes in supply, this attribute has considerable significance from a marketing standpoint.

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In process of preparation by Boston College is a comparative analysis of the scallop fishing industries of New England and Canada in order to determine the long-term competitive advantages and disadvantages of each area. Data on the cost of production are being analyzed in an effort to explore present and future alternative economic opportunities available to capital and labor.

Scallop promotion.—The Bureau cooperated with the New England sea scallop industry in an August sales push to facilitate the movement of sizeable scallop inventories into normal market channels. The Bureau arranged promotional tie-ins with the ripe olive and cranberry industries. As a result of this cooperative industry-Government effort, normalcy was restored to the scallop market.

Great Lakes

Kaho commissioned.—The Bureau's new 65-foot exploratory fishing and gear research vessel *Kaho* was commissioned in late October. It will be based at Saugatuck, Mich., and will start exploratory work in the Great Lakes early in 1962.

Great Lakes lamprey-control and lake trout-rehabilitation programs.—The Great Lakes lamprey-control program, a cooperative effort of the Bureau and the Fisheries Research Board of Canada, progressed during the year, as did the related program to rehabilitate lake trout.

In Lake Superior sea lamprey larvae were destroyed in streams entering the lake. The chemical treatment of all the lamprey-producing streams, which started in 1958 and was completed in 1960, destroyed the larvae before they reached the parasitic adult stage when they had been rapidly decimating the valuable lake trout stocks. The selective treatment did virtually no harm to fish but eradicated the larval population. This led to a sharp reduction in sea lamprey wounds on lake trout in the fall of 1961, giving evidence that control was being achieved.

Rehabilitation of the highly prized lake trout is well under way in Lake Superior. Nearly 6 million hatchery-reared lake trout were stocked in the lake from 1958 to 1962. Millions more are to be planted each year until the population is restored. Survival has been excellent, and in many areas of the lake, the hatchery-reared lake trout, marked by clipped fins, outnumber the natural lake trout. Now that control of the sea lamprey is a reality, protective measures are being initiated to conserve the small spawning stock that remains in the lake.

The success in controlling the sea lamprey in Lake Superior has brought renewed hope for Lake Michigan where lake trout have be-

come virtually extinct and other commercial species strongly affected. After the disappearance of the lake trout, the sea lampery turned to the larger species of chubs for food. A 2-year survey of the chub stocks of Lake Michigan was completed in 1961 and showed that two of the larger species of chubs have become extinct and the abundance of others greatly reduced. The small, slow-growing bloater chub, which once was the main food of lake trout, now constitutes over 90 percent of the chub population. Limited markets for bloater chubs, as well as the small alewives and smelt, which have recently become abundant in the lake, have brought severe hardship to the fishing industry.

Restoration of a balanced fish population in Lake Michigan has begun. Sea lamprey larvae were eradicated in 26 tributary streams during 1960–61. Small trial plantings of hatchery-reared lake trout have had excellent survival. These fish have dispersed throughout the lake and have shown rapid growth.

In Lake Huron, 13 streams have been treated and lamprey eradicated.

Studies on decline of fish stocks in Lake Erie.—Studies to find causes for the drastic declines of the blue pike and walleye fisheries of Lake Erie have produced evidence of marked environmental changes. Various chemicals related to domestic and industrial wastes flowing into the lake have increased steadily in recent years. The resulting enrichment of the environment has caused severe oxygen depletion of the bottom water over thousands of square miles of the lake. Dramatic changes occurred in the abundance of fish-food organisms living on the bottom. The resultant influence of these factors has led toward declines in the stocks of high-value species of the lake and increased abundance of less desirable species of limited market potential.

Assistance to Arkansas fish farmers.—The Bureau intensified its market-development and technical assistance efforts to aid the Arkansas fish-farming industry in the commercial production and utilization of fish produced in flooded rice acreage in rotation with rice field crops. The one to two million acres of lowland farms in Arkansas and adjacent States offer a tremendous potential, estimated to be as high as 250 million pounds annually, for commercial fish production for human and animal food. This represents a vast potential reservoir to meet the future food needs of our expanding population. At present, only a very small portion is being utilized. The new facilities at the Laboratory in Ann Arbor, Mich., have enabled technological studies to be made on problems related to fish farming. Buffalofish and other pond-reared fish have been processed into marketable forms as frozen breaded portions and fillets. Product de-

velopment, testing of packaging materials, and storage tests of products will be continued.

General

Oceanography program.—During the past 3 years the Bureau of Commercial Fisheries has been working closely with other Government agencies, universities, and private research institutions to plan and carry out a coordinated national program in oceanography. The principal coordinating agencies have been the Interagency Committee on Oceanography (ICO) of the Federal Council for Science and Technology and the National Academy of Sciences Committee on Oceanography.

The Bureau's responsibility in the national program in oceanography is particularly for biological studies. In this connection the Bureau has continued studies to increase men's basic knowledge about the oceans and also has supported programs concerned with the development of particular fisheries. Research has been directed toward gaining a better understanding of the ocean environment in order to develop better methods for predicting places and times of fish concentration. Other programs have been concerned with the discovery of unexploited stocks; development of new and more efficient means to capture marine organisms; control of environment to increase natural production—"farming" the sea, so to speak; and use of new sources of protein not previously taken from the sea.

Budget increases for oceanography were used during the past year to support new programs for education and for training grants and fellowships, to increase efforts in fish and invertebrate taxonomy, to contribute to the operation of the National Oceanographic Data Center, to make basic studies of estuaries and coastal waters, and to learn more about the behavior patterns of fishes in order to increase the efficiency of the fishing process.

In March 1961 plans for fishery investigations of tropical Atlantic waters off Central Africa were drafted and proposed as The Tropical Atlantic Oceanography Fishery Program by the Bureau to ICO. The program was endorsed by that agency. Until recently this fertile marine region has been unexploited; however, for the past several years it has been fished intensively by fishermen from Japan and other countries. Besides making these sources of protein known and available to the undernourished people of the world, the investigations, if carried out after they are formally recommended by the Bureau, will enable this country to gain a thorough knowledge of the oceans of the world and to participate in the exploitation of these waters.

Major progress was made in the funding of new research vessels and shoreside facilities, including: a new oceanographic-fishery research vessel, the *Townsend Cromwell*, for use in the central Pacific; an exploratory fishing vessel to replace the *Delaware;* a new fishery research vessel to replace the *Albatross III* for use in the New England area; a new fishery laboratory to be located on the Scripps Institution of Oceanography campus; and badly needed improvements to existing facilities at the Bureau's Biological Laboratories at Boothbay Harbor, Maine, Oxford, Md., and Auke Bay, Alaska. The Laboratory at Auk Bay was just completed in December 1960.

Fish oil research.—Bureau researchers developed new analytical techniques to produce better fish oil fractions and devised new methods to determine rapidly the chemical components of such fractions. The Bureau's molecular still at the Technological Laboratory in Seattle is being used to produce special fractions for many researchers outside the fisheries, especially in the fields of medicine and nutrition, and in the paint industry. Researchers in these specialized fields are being supplied with tailormade fish oil fractions. Using the newly developed methods, Bureau researchers found that the body oils of the dogfish shark contain a high amount of mono-enoic acids. These acids have special properties that may create a demand to reactivate the dogfish industry.

Radiation preservation studies.—Significant advances were reported for 1961 in the program of low-level radiation (pasteurization) of fishery products. Studies on fresh clams and haddock demonstrated that the shelf life of these products can be increased as much as 2 weeks. This means that the products may be held as long as 30 days before they are unfit for human consumption. The program was expanded to include species native to the Northwest Pacific. Initial studies are underway on low-level radiation preservation of fresh flounder and rockfish. Low-level radiation must be used with good refrigeration practices to derive the full benefit of the process.

Frozen foods studies.—Several studies are in progress on the effects of time and temperature on frozen fish and shellfish. They were requested by industry because of the increased interest shown in the proper handling and marketing of frozen fish and shellfish. One study is on the effects of time and fluctuating temperatures on the quality of frozen fishery products in the commercial distribution chain. Other studies concern the effects of controlled temperature fluctuation on product quality and the development of objective tests for measuring time-temperature history. The Bureau has also started

microbiological studies of frozen fishery products. The results of these studies will be compiled in a manual on all phases of production and handling of frozen fish and shellfish.

U.S. standards for fishery products and certification service.—U.S. standards were developed for grades of two more fishery products—frozen fried scallops and frozen sole and flounder fillets. There are now 12 quality standards upon which the Bureau bases its inspection and certification service. In addition, three other standards are being revised. Technical assistance was also provided by the Bureau in the development of specifications for ocean perch, cod, and haddock fillets for use of State Purchasing Officials and on a revision of a Federal specification for frozen raw breaded shrimp. These standards and specifications are tools by which the industry or other interested parties can measure product quality. The consumer benefits, because such standards and specifications tend to raise the quality level of the product.

A meeting was held by the Bureau in June 1961 with representatives of the fishing industry and other interested parties to discuss the existing inspection program for fishery products and the changes in the program that are needed to satisfy better the industry and the U.S. consumer. Suggestions made by the industry were carefully evaluated and are now being put into effect.

Rough-fish market development.—The Bureau's intensive program of developing markets for underutilized fish continued. Markets were further expanded in the pet-food and mink-food industries, with a salutary effect on a number of fresh-water and marine fisheries. As the result of Bureau efforts, a number of major pet-food concerns are contemplating expansion of existing production facilities and construction of new pet-food plants in the Great Lakes and Gulf of Mexico areas.

Fish-cooking demonstrations.—To stimulate fish use at the institutional and the homemaker level, Bureau home economists presented 198 fish-cookery demonstrations for school-lunch and other institutional supervisory food-preparation personnel, participated in 10 national food trade and professional conventions, and appeared on numerous television and radio food shows throughout the United States. They developed kitchen-tested recipes for institutional and homemaker use, distributing them through booklets, recipe folders, and copy for radio, television, and newspaper and magazine food publicists.

Consumer education.—The Bureau again cooperated with the commercial fishing industry in a number of industrywide, national, market-promotion efforts. Public-service, consumer-education mate-

rials were distributed to newspaper and magazine food editors, radio and television food personalities and public-service directors, extension specialists, the mass-feeding industry, the retail food trade, and others in a position to publicize and merchandise fishery products. Bureau home economists and marketing specialists also appeared on radio and television food shows. They stressed the nutritional value, ease of preparation, and variety of fishery products. As an example of the cooperation received from newspaper food editors, during the 1961 Lenten period, February to April, over 222,000 column inches of food-column space were devoted to fish. This represented an advertising value of about two million dollars to the industry. Over one-third of this publicity was based on Bureau consumer-education releases.

Bureau-produced motion pictures.—An industry-financed educational motion picture, "Fishing Five Great Lakes," was completed and another, "Watermen of Chesapeake," was started during the year. Twenty Bureau-produced, and for the most part industry-financed, fishery educational motion pictures are now in national distribution through some 180 cooperating film libraries and Government distribution channels. An audience of over two million persons, exclusive of the audience viewing public service television showings, annually see these films. Bureau motion pictures received two international and three national film festival awards during the year. Since 1946, 18 international and national film festival awards have accrued to the Department as the result of Bureau-produced educational motion pictures.

Market News Service reporting.—During the past year the fishing industry continued to be provided with current information on landings, receipts, prices, market demand, stocks, imports and exports, and new developments in domestic and foreign fisheries in order to aid in the orderly marketing of edible fishery products as well as industrial fishery products. Reports again were issued daily by the seven Market News Service offices at Boston, New York City, Hampton, Va. (includes data from Baltimore, Md.), New Orleans, San Pedro, Calif., Seattle, and Chicago. Coverage of the fish meal, oil, and solubles market proved vital to the industry when it encountered marketing problems during the year.

Fishery statistics.—For each of the 42 States supporting commercial fisheries, data were assembled on employment of fishermen, fishing craft, and gear used in the capture of fish and shellfish; on the volume and value of the catch; and on the production of manufactured fishery commodities. Monthly fish and shellfish landing bulletins for 22 States were issued in cooperation with the State fishery departments.

Information was released each month on freezings and cold storage holdings of fish and shellfish and on the production of fish meal, oil, and solubles. A report containing definitions and sketches of the principal types of fishing gear was published as a guide in the reporting and tabulating of information on fishery operating units and the catch by gear.

Fisheries Financial Assistance Programs

The Bureau administers three programs that give direct financial assistance to the fisheries.

Fisheries Loan Program

Under the Fisheries Loan Program, operations that began in the latter part of 1956 were continued. In August 1961 a memorandum of understanding with the Small Business Administration was terminated. The agreement had provided that SBA make financial investigations of applications for loans and also close and service approved loans on a reimbursable basis. By the end of September all of this work was taken over by the Bureau of Commercial Fisheries.

During the fiscal year 184 applications totaling $4,718,050 were received, bringing the total since the program began to 961 for $28,949,169 (Appendix C). Eighty-nine applications for $2,080,552 were approved during the year while 45 applications for $753,560 were declined. Approximately 50 percent of the funds loaned were to California fishermen primarily for the purpose of converting tuna clippers to tuna purse seiners. The loans were large because tuna clippers are among the largest vessels used in the U.S. fisheries and the conversion required considerable structural changes as well as expensive nets. The conversion of these vessels revived this segment of the industry to a point where instead of being one of the least profitable U.S. fisheries, it became one of the most profitable.

Fishing Vessel Mortgage Insurance Program

The Bureau assumed the responsibility for this program after the passage of the Act of July 5, 1960. The program provides for insurance of mortgages given for the construction, reconstruction, or reconditioning of fishing vessels. During the fiscal year 1961 there were four applications for insurance on $229,500, and all of them were approved. Banks and insurance companies began to appear interested by the end of the year. Previously, they had shown little or no desire to provide funds because of the tight money market.

Fishing Vessel Construction Differential Subsidy Program

This Bureau program was authorized by the Act of June 12, 1960. It provides for the payment, under certain very restrictive conditions, of a subsidy equal to the difference between the cost of construction of a fishing vessel in a domestic shipyard and the cost of construction in a foreign shipyard, with a maximum limitation of 33⅓ percent of the cost of construction in a domestic shipyard. One of the restrictions is that the vessel must be designed to operate in a fishery which has received a finding of injury or threat of injury by reason of increased imports. In effect this has confined the program to those vessels designed for fishing for groundfish in New England. Relief for this fishery has been recommended by the Tariff Commission under the Escape Clause of the Trade Agreements Extension Act of 1951, but relief was denied under Section 7(c) of the act. During the fiscal year three applications totaling $184,887 for subsidies for construction of fishing vessels were received from this fishery. All of these cases were in various stages of processing at the end of the year.

New Programs

In 1961 the Bureau began two new programs that will benefit the U.S. fishing industry. One eventually should benefit also the fishing industries of many countries and affect populations all over the world. The other program concerns only one of our fishing industries and should produce direct and immediate effects on it.

Manufacture of Fish Protein Concentrate (FPC)

The Bureau started a study on the manufacture of fish protein concentrate. Processed from whole fish, FPC is a fine powder that contains the essential amino acids and the minerals and vitamins needed by man to maintain body health. This product, which can be odorless and tasteless, is being considered as a protein supplement, particularly in those areas of the world that have a deficiency of animal protein. The Food and Agriculture Organization recommended that an inexpensive, edible, fish-protein-concentrate food product be found to combat world malnutrition. This recommendation stimulated the Bureau to begin the first phase of the overall study. The Bureau also felt that the manufacture of FPC would create new markets for domestic fish and fish meal, which will expand and help to stabilize the U.S. fishing industry. The first phase of the overall study is a world survey of the processes now being used

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to manufacture FPC. Studies of the processes under development in South America, Europe, and the United States have already been finished. Upon completion of the first phase of the program, the survey results will be reviewed by a panel of scientific experts of the National Academy of Sciences to determine which of the many processes are worthy of further intensive research by the U.S. Government. Based on these recommendations, pilot processing studies will be undertaken by the Bureau to develop methods for manufacturing an inexpensive, high-quality fish protein concentrate.

Mechanization of Blue Crab-Processing Industry

The Bureau began a study on the possible mechanization of the blue crab-processing industry. Since the blue crab industry relies largely on hand labor, particularly in removing the meat from the cooked crabs, passage of the minimum wage law doubled labor costs. Were such increased costs passed on to the consumer, the product might be priced out of the market. Recognizing that immediate assistance was necessary, the Bureau contracted with a private consulting firm to develop emergency stopgap improvements to reduce costs under present processing methods. This study has been completed, and the results have been made available to industry. As a second step, a contract has been approved to develop a model mechanized processing unit to meet the needs of this industry.

Meetings

The Bureau of Commercial Fisheries sends representatives to many meetings each year to help form international policy on marine fishery resource conservation and on trade in fishery products and to contribute the findings of Bureau scientists to international groups of scientists and to learn of others' findings. Bureau representatives also attend national meetings that concern our fishery resources and our fishing industry. They attend meetings, many with Federal, State, and private fishery organizations.

Some of the international meetings of interest are discussed in the section International Developments. Two others of particular significance were the Government-Industry Oceanographic Instrumentation Symposium and the International Meeting on Fish Meal.

Oceanographic Instrumentation Symposium

One of the most critical needs in the national oceanographic program of research and exploration is for new and improved instruments. To define the needs and to encourage industry to help develop them, the Government-Industry Oceanographic Instrumentation Symposium was held in Washington, D.C., in August 1961. The Symposium was sponsored by the Interagency Committee on Oceanography (ICO) of the Federal Council for Science and Technology. The Bureau of Commercial Fisheries played a prominent role in the planning for the meeting, which was held in the Department of the Interior Auditorium.

The Symposium was attended by 540 representatives from industrial concerns with an interest in oceanographic instrumentation, 139 representatives from Government, 32 from nonprofit institutions, 22 from the press, 4 from embassies of foreign countries, making a total of 737 attendees. Since the meeting there has been a continued flow of proposals from the industry for the development of new instruments. Judging by this keen interest on the part of the industry, the meeting was successful.

International Meeting on Fish Meal

The FAO International Meeting on Fish Meal was held in Rome in March 1961 at the request of member governments because of the adverse market conditions for the product. The purposes of the meeting were to assess the world demand for fish meal in relation to resources and productive capacity, to consider ways of increasing the demand, and to explore possibilities of ensuring stable conditions in the international market for fish meal. Bureau participants were among those from 27 nations, as well as observers from several international organizations, attending the meeting.

The survey made of the world situation for fish meal showed that (1) there are large stocks of fish which are relatively unexploited; (2) the long-range production of fish meal depends upon demand rather than supply; and (3) there is a pressing need for research leading to the development and use of fish protein concentrate for human feeding. As a result of the survey, industry organizations and member governments are taking steps to effect market stabilization of fish meal in quality and production.

Cooperation and Coordination With International, Federal, State, and Other Agencies

The Bureau cooperates with and coordinates its programs with those of various foreign governments, other Federal agencies, States, universities, and private agencies. This cooperation and coordination takes the form of international agreements and treaties, formal and informal agreements with Federal and State agencies, and contracts and informal agreements with State conservation departments, universities, and private associations. Such cooperation and coordination not only fosters the exchange of ideas and research results but also ensures the best use of available manpower and facilities.

Through cooperation with other countries, information basic to solving mutual problems is developed and exchanged. The research efforts of a number of countries are coordinated by such international organizations as the Food and Agriculture Organization of the United Nations (FAO), the International Commission for the Northwest Atlantic Fisheries (ICNAF), the International North Pacific Fisheries Commission (INPFC), the Great Lakes Fishery Commission, and the Commission for Conservation of Shrimp in the Eastern Gulf of Mexico.

In September 1961 the Bureau, representing the United States, was host to the FAO International Conference on Fish in Nutrition in Washington, D.C. The main objectives of the Conference were to bring together the leading scientists in the fields of nutrition and fishery technology to evaluate the total knowledge available and to direct future research. The Conference, the first meeting of its kind, was attended by over 300 scientists from 35 countries and international organizations. A survey of our present knowledge in different fields was presented in 33 review papers, supported by 35 original scientific and technical papers. Discussions concerned the nutritional qualities of fish for human and animal diets and ways of disseminating this knowledge and making more available good quality fish and fishery products to the people of the world, particularly to those in underdeveloped areas where hunger and malnutrition are prevalent.

The Bureau cooperates closely with a number of national, regional, and local fishery and allied trade associations. These embrace virtually all research, development, and service functions of the Bureau.

Interstate commissions are the media through which the Bureau functions in formal agreements with States. Two of these commissions are the Gulf States Marine Fisheries Commission and the Atlantic States Marine Fisheries Commission. Interstate commissions coordinate the research efforts and conservation actions of the States

involved in such compacts. Much of the scientific data upon which these interstate commissions act is provided by Bureau researchers.

Informal agreements between the Bureau and State agencies and universities are represented in a number of cooperative efforts.

In the summer of 1961, the Bureau's Biological Laboratory at Honolulu and the State of Hawaii jointly started a program of experimental gill net fishing for tunas. The first summer's work yielded rather inconclusive results, so the tests are being continued during 1962. If the experiments should prove successful, the results can add greatly to the efficiency of the Hawaiian tuna fishermen.

The Bureau and the State of Michigan cooperated closely during 1961 in developing a trawl fishery in Lake Michigan. By agreement, Michigan requires holders of experimental trawl permits to keep detailed catch records that Bureau biologists can use in studies of abundance, distribution, and species composition of fish stocks in the trawling areas. The Bureau biologists, in turn, provide analyses useful to the State for development and regulation of the fishery.

For the past 10 years the Bureau's Bological Laboratory at La Jolla has taken part in the California Cooperative Fishery Investigations (CALCOFI). These investigations have been studying the physical, chemical, and biological environment in the eastern Pacific with particular attention to factors contributing to the varying abundance of the sardine and ecologically associated species. Other agencies participating in this program are the California Department of Fish and Game, Scripps Institution of Oceanography, the California Academy of Sciences, and Stanford University. Recent interpretations of the data collected by CALCOFI show a possible reciprocal relation between the abundances of the Pacific sardine and the anchovy. The drastic decline in the abundance of the sardine since 1945 has been accompanied by a marked increase in the anchovy. Details of the relationship are yet to be defined, however.

Formal and informal agreements exist between the Bureau and other Government agencies—the Atomic Energy Commission (AEC); Federal Trade Commission; Department of State; Department of Health, Education, and Welfare; Department of Agriculture; Department of Labor; Department of the Treasury; Department of Commerce; Weather Bureau; and various defense agencies.

Twice during 1961 at the request of the International Cooperation Administration, the Bureau made surveys of fishing industries in foreign countries. The first was in certain underdeveloped West African countries. These countries were Ghana, Nigeria, Ivory Coast, and Sierra Leone. Brief studies were made in Liberia and Senegal. Study was made of facilities for production, processing, marketing, and utilization of fishery products. The survey team of three fishery

specialists recommended to these countries fishery programs designed to utilize their fishery resources as a source of high-quality protein food and thereby increase the supply and demand within the countries.

The second survey was of the fishing industry in Panama. Sufficiently detailed field studies were made to provide perspective for establishing the existing level of the fisheries industry activities. On the basis thus established, the Bureau made recommendations on the direction, locality, and extent of specific activities which would produce greater catches and more effective processing.

For the past 2 years, the Bureau's Biological Laboratory at San Diego has sponsored a cooperative albacore-trolling program aboard the picket vessels of the U.S. Navy off the southern California coast. These vessels are a part of the radar early warning surveillance network, operated by the Navy since 1956 off the west coast of the United States. The surveillance system includes five continuously occupied stations up to 200 miles offshore from the Cobb Seamount on the north to latitude 32° N., longitude 124° W. off San Diego, Calif., on the south. This program in cooperation with the Navy has proven highly successful for it has offered a unique recreational opportunity to crew members where previously there was none. Each vessel is supplied with a kit of fishing gear. Each kit consists of a 30-fathom line, a shock-cord assembly, and a standard Japanese-type feather trolling jig. The catches and surface temperatures are recorded, along with the length of time each line is fished, on special log sheets provided by the Bureau. The resulting data are useful in plotting the distribution of albacore in relation to temperature. They have also contributed information on albacore migrations and seasonal variations in abundance.

The Bureau in cooperation with the AEC began a study on the deepwater marine resources off the coasts of Oregon and Washington in 1961. Initial operations by the Bureau's exploratory fishing vessel *John N. Cobb* resulted in the establishment of a track line and standard sampling stations off the Columbia River. These stations were surveyed during the summer and fall by the research vessel *Commando*, chartered from the University of Washington. Drags were successfully made at depths to 475 fathoms. Several marketable species were taken in commercial quantities. This cooperative work will continue in 1962.

In connection with its responsibilities for management of the Pribilof Islands fur seal herds and the maintenance of the two Aleut communities on those islands, in 1961 the Bureau had cooperative agreements with the Public Health Service in providing medical and dental services, with the Alaska Department of Education in operating the school system, with the Department of the Navy in

conducting an annual resupply operation, and with the Bureau of Indian Affairs in relocating Aleut residents.

The Coast Guard assists the Bureau in carrying out its enforcement responsibilities under the Fur Seal Act of 1944, the Northwest Atlantic Fisheries Act, the North Pacific Fisheries Act, the Northern Pacific Halibut Act, and the Sockeye Salmon Fishing Act. The State of Washington also assists in enforcing the laws and regulations issued pursuant to the Sockeye Salmon Fishing Act. Likewise, the Bureau cooperates with the Bureau of Indian Affairs in maintaining an overview of the operation of fish traps in three native communities in Alaska.

The Columbia River Fishery Development Program is a cooperative endeavor with the fish and game agencies of the States of Washington, Oregon, and Idaho and the two component Bureaus of the U. S. Fish and Wildlife Service. The Bureau of Commercial Fisheries, in meeting its responsibilities for the general administration and coordination of this program at the Federal level, has developed cooperative arrangements with the Bureau of Reclamation, Corps of Engineers, and other Federal and State agencies.

The Bureau also made extensive use of the professional talent and research facilities of a number of universities, State agencies, trade associations, and private organizations by contracting with such groups to supplement Government research and service activities. A substantial part of the 2-year emergency research program now in progress in Alaska is performed under contract to the Bureau by the Fisheries Research Institute of the University of Washington and the Alaska Department of Fish and Game. Studies by the Fisheries Research Institute have provided important new information on the optimum spawning requirements of Bristol Bay red salmon runs. The Alaska Department of Fish and Game made a substantive contribution in their studies on the growth and survival of red salmon. Appendix D lists the organizations with which the Bureau had formal contractual arrangements in 1961.

Organization, Employment, Budget, and Physical Property

Organization

In 1961 the position of Program Development Officer was added to the Director's Office of the Bureau of Commercial Fisheries in Washington, D.C. During the latter half of the year there was a complete restructuring of the Branch of Marketing both in the Headquarters Office in Washington, D.C., and in the field. A number of Bureau marketing personnel were relocated and seven marketing offices were

opened in new locations to permit increased program emphasis on the 50 major metropolitan marketing centers in the United States. A chart of the Bureau's organization is shown in Appendix E, and a map of the five regional and two area offices and the territory under each is shown in figure 1.

Employment

The total employment for the Bureau of Commercial Fisheries averaged 1,735 throughout calendar year 1961. Of this total average, 1,525 were permanent and 210 were seasonal employees. The peak employment for the year was reported at the end of July, at which time the staff had 1,533 permanent and 437 seasonal employees, making a total of 1,970. The variations in the number of employees throughout the year and the relationship between the total number and the number of permanent employees and seasonal, or temporary, employees are shown in figure 2.

Bureau employees fall generally into four broad categories. Of the total of 1,652 full-time employees reported as of October 31, 1961, 740 were classified in approximately 36 professional and technical series; 179 in 20 subprofessional series; 371 in 33 administrative and clerical series; and 362 were in positions, the pay of which is determined outside of the Classification Act (105 vessel employees, 101 custodial employees, and 156 Aleuts). Figures 3, 4, and 5 show the grade structures for the professional and technical series, subprofessional series, and the administrative and clerical series and the number of employees in each grade for these three classifications.

Budget

For the fiscal year 1961, $25.5 million were available to carry out the Bureau's program (Appendix F). Of this amount, $13.6 million were from annual appropriations; $5.4 million from Public Law 466 (known as the Saltonstall-Kennedy Act) funds; $3.3 million from funds transferred by the Corps of Engineers, and $0.8 million made available to the Bureau by the Great Lakes Fishery Commission.

Figure 6 shows the available funds to carry out the Bureau's program for each year from 1957 to 1961.

Physical Property

Field laboratories and stations, vessels, and installations on the Pribilof Islands are the principal properties of the Bureau (Appendix

G). In the calendar year 1961 there were 27 large laboratories and installations, 73 smaller stations and offices, and 28 vessels of 40 feet and longer. One new major laboratory was acquired during the year. That was the Biological Laboratory at Auke Bay, Alaska. The construction of this Laboratory was completed in December 1960, the award for which had been granted in May 1959 in the amount of $405,647. Two major Branch Loans and Grants Offices were established at St. Petersburg Beach, Fla., and Boston, Mass. Five new field research stations were put into operation at Olsen Bay and Traitors Cove, Alaska; Green Cove Springs, Fla.; Hammond Bay, Mich.; and Portland, Oreg. An exploratory fishing and gear research station was opened in Panama City, Fla. Two market news and statistical field offices were opened at Port Arthur and Port Isabel, Tex.; two statistical field offices at La Crosse, Wis., and Portsmouth, Va.; and seven marketing offices at Dumas, Ark.; San Francisco, Calif.; Atlanta, Ga.; Chicago, Ill.; Baltimore, Md.; St. Louis, Mo.; and Cleveland, Ohio. A number of stations and offices were closed: six field research stations at Decatur, Ala.; Pribilof Islands, Alaska; Eastport, Maine; Vineyard Haven, Mass.; Rogers City, Mich.; and Aconto, Wis.; one exploratory fishing and gear research station at Erie, Pa.; three statistical field offices at Galiano, La.; Astoria, Oreg.; and Milan, Tenn.; one marketing office at Jacksonville, Fla.; three market news offices at Port Sulphur, La.; Freeport, Tex.; and Portsmouth, Va.; and one fishery products inspection office at Seattle, Wash. Besides the exploratory fishing and gear research vessel *Kaho* which was commissioned during the year, the Bureau acquired four other vessels—*J–3486*, *Q–91*, *Q–100*, and *T–19*, which are on loan to the States of North and South Carolina.

In fiscal year 1961 construction contracts were awarded for the replacement or improvement of several Bureau research facilities and a vessel. The award for the construction of the sea-water laboratory at the East Beach Lagoon unit of the Biological Laboratory in Galveston, Tex., was made in December 1960 in the amount of $120,320. This laboratory was completed and is now in operation. Two awards were given for construction in the Pribilof Islands, one in the amount of $176,700 for a combination power house and cold storage building on St. George Island and the other in the amount of $178,036 for a diesel fuel oil storage tank on St. Paul Island. The design of a new fisheries research vessel to replace the Albatross III was completed, and the construction contract was awarded in May 1961 in the amount of

690-217 O—63——6

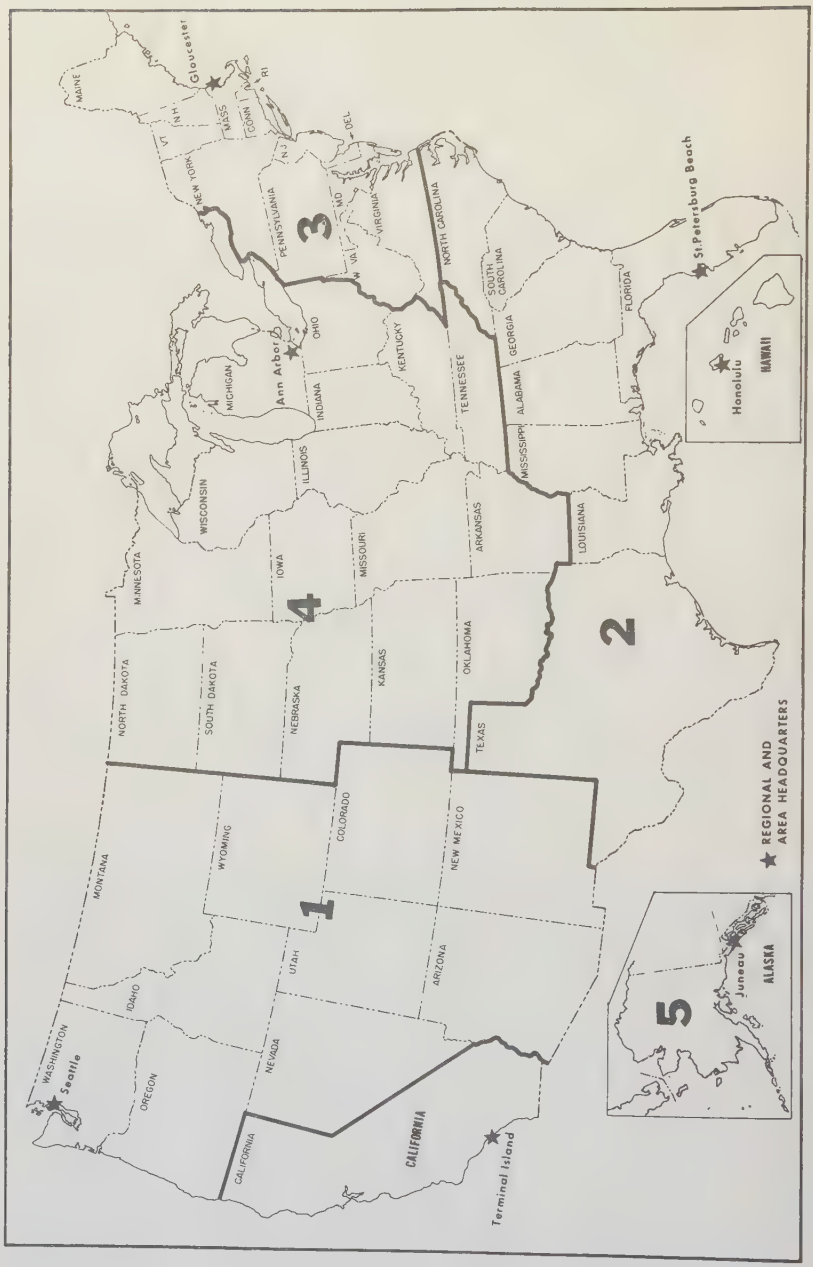


FIGURE 1.—Regions and areas, Bureau of Commercial Fisheries.

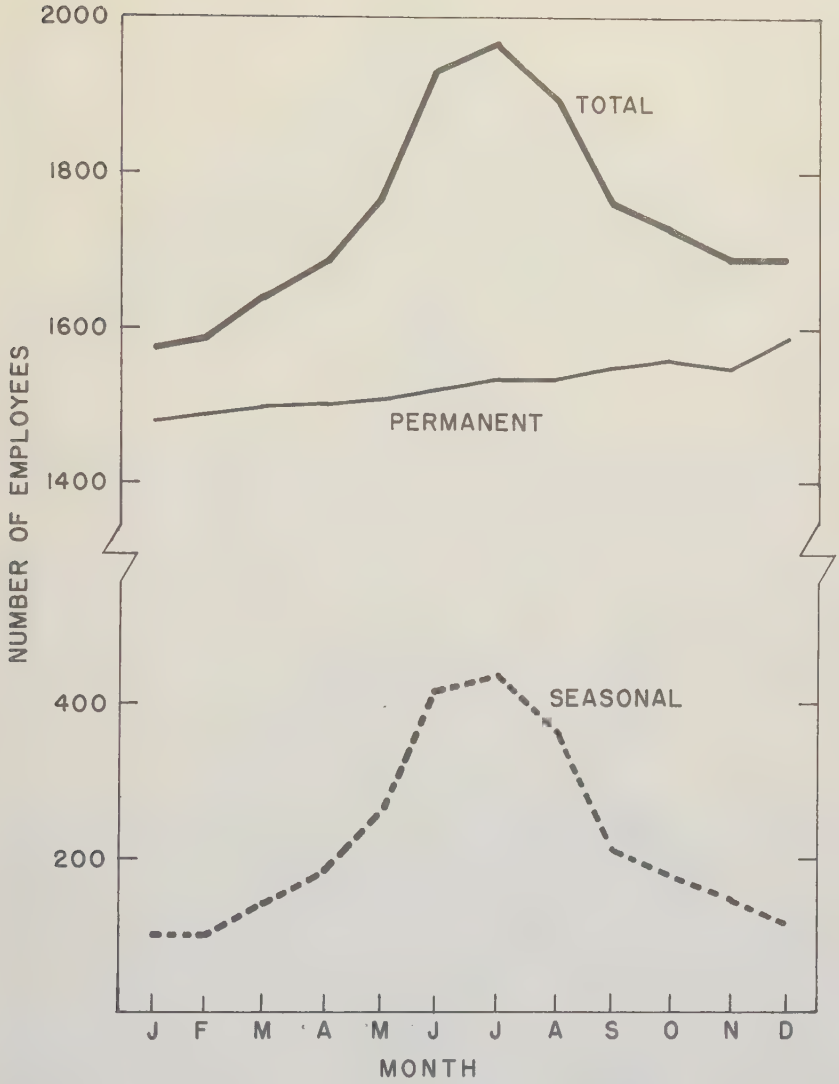


FIGURE 2.—Bureau of Commercial Fisheries employment totals, calendar year 1961.

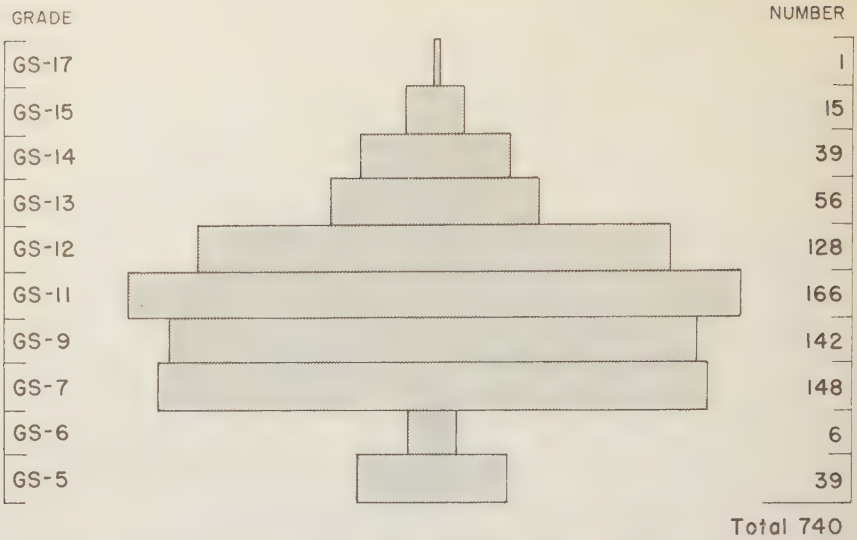


FIGURE 3.—Distribution by grade of professional and technical employees, Bureau of Commercial Fisheries, October 31, 1961.

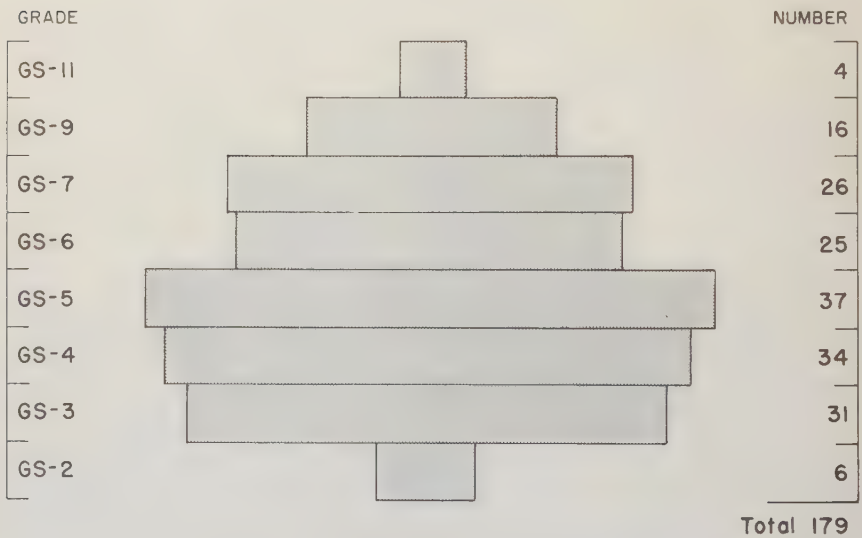


FIGURE 4.—Distribution by grade of subprofessional employees, Bureau of Commercial Fisheries, October 31, 1961.

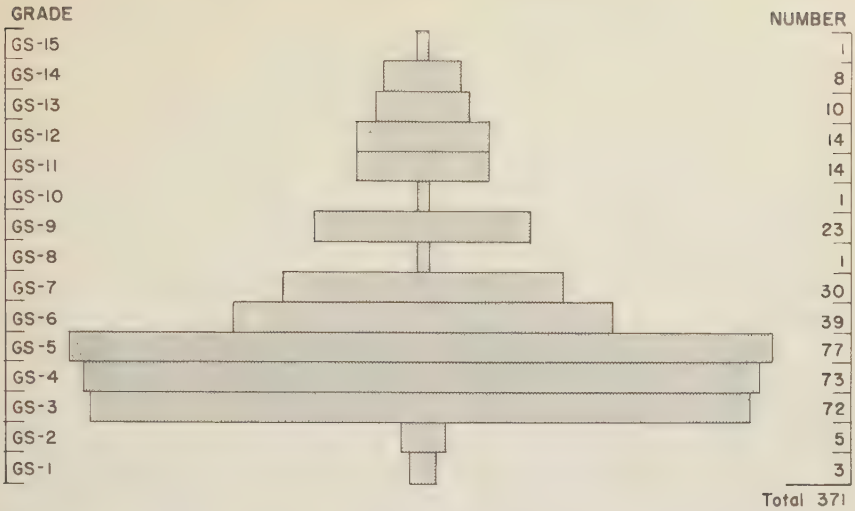


FIGURE 5.—Distribution by grade of administrative and clerical employees, Bureau of Commercial Fisheries, October 31, 1961.

$1,773,948. The construction of a laboratory building at Oxford, Md., was completed during fiscal year 1961, the contract for which had been awarded in the amount of $152,173 in September 1959. The aquarium at Woods Hole, Mass., was also completed at a cost of $454,000. This contract had been awarded in June 1959.

Publications

Reflecting the wide range of the Bureau's interests, the 1961 publications covered activities in numerous fields that relate to fisheries: biology, chemistry, economics, engineering, marketing, and statistics. There was continued emphasis on publishing material of value to the fishing industry and the general public.

Exclusive of the 5 times-a-week Fishery Products Reports issued by the seven Market News Service field offices, a total of 696 publications (11,305 p.) were sponsored by the Bureau in 1961. In the Fish and Wildlife Service series were published 468 reports (9,574 p.); the remaining 228 (1,731 p.) appeared in nonservice journals and series. Bureau personnel wrote most of the articles; some were written by unpaid collaborators or members of research institutes under contract.

The 1961 publications can be divided into four principal classes which reflect the audiences for which they were written. First, there

are the statistical reports of special interest to the fishing industry and fishery research workers. More than 38 percent of the 1961 publications were statistical in nature. Secondly, there are the contributions to scientific knowledge, particularly relating to fisheries; 40 percent of the 1961 publications fell in this class. Thirdly, there are the reports written especially for commercial and industrial fishery audiences; 14 percent were aimed at those groups. Fourthly, the popular audience was the object of 8 percent of the Bureau's publications.

Appendix H presents a description and partial list of the 1961 publications.

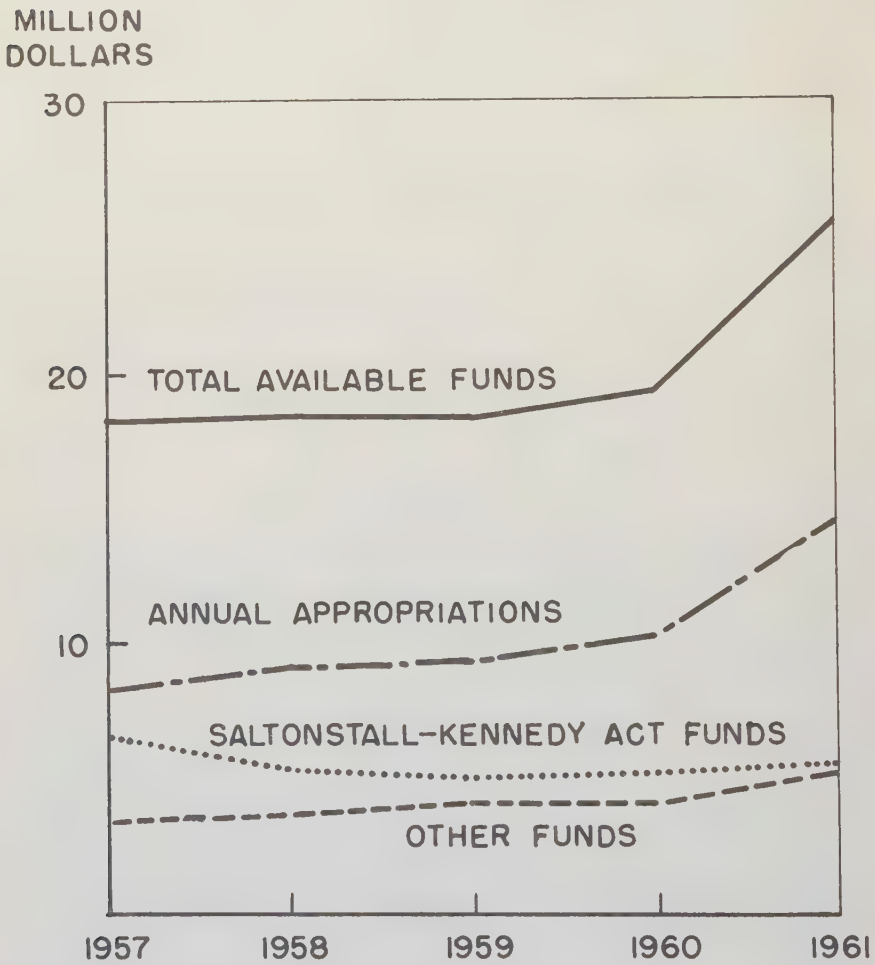


FIGURE 6.—Funds available to the Bureau of Commercial Fisheries, fiscal years 1957–61.

Appendix A—Fisheries of the United States

A–1.—*Employment, fishing craft, and establishments, calendar years, 1961 and 1960*

Item	1961	1960
Persons employed:	*Number*	*Number*
Direct:		
Fisherman	129,693	130,431
Shoreworkers	92,115	93,625
Indirect:		
Allied industries (gear, manufacture, boat building, processing equipment, etc.)	310,000	313,000
Total	531,808	537,056
Craft utilized:		
Fishing:		
Vessels (5 net tons and over)	11,964	12,018
Motor boats	60,118	56,889
Other boats	5,405	8,150
Total	77,487	77,057
Vessels documented for fishing:		
First documentation	409	408
Redocumentation	20	24
Total	429	432
Fishery shore establishments:		
Pacific Coast States	558	515
Atlantic Coast and Gulf States	2,870	2,898
Great Lakes and Mississippi River States	690	772
Hawaii	20	22
Total	4,138	4,207

A–2.—*U.S. catch, calendar years, 1961, 1960, and record year*

Species	1961		1960		Record catch	
	Million pounds	*Million dollars*	*Million pounds*	*Million dollars*	*Year*	*Million pounds*
Menhaden	2,315	26	2,018	20	1961	2,315
Tuna	326	45	298	38	1950	402
Shrimp	175	52	249	67	1954	268
Herring, sea:						
Atlantic	58	1	155	3	1902	201
Pacific	54	1	84	1	1937	263
Salmon	310	52	235	45	1936	791
Crabs	232	17	222	17	1961	232
Ocean perch, Atlantic	132	5	141	5	1951	258
Industrial fish [1]	143	2	137	2	1959	248
Flounders	133	12	127	13	1948	139
Haddock	134	10	119	9	1929	294
Whiting	101	2	112	3	1957	133
Jack mackerel	98	2	75	2	1952	147
Oysters	62	33	60	29	[2] 1908	152
Sardine, Pacific	43	1	58	1	1936	1,502
Alewives	55	1	54	1	1908	90
Halibut, Pacific	53	8	51	6	1915	67
Clams	50	12	50	12	1961	50
Cod	50	3	46	3	1880	294
Mullet	43	3	41	2	1902	43
Mackerel, Pacific	44	1	37	1	1935	146
Anchovies	8	[3]	5	[3]	1953	86
Other	562	75	568	74	----------	----------
Total	5,181	364	4,942	354	----------	----------

[1] Unclassified species used for bait, reduction, and animal food.
[2] First year in which an oyster survey was made in all regions.
[3] Less than one-half million dollars.

A–3.—*Summary of manufactured fishery products by quantity and value, calendar years 1961 and 1960*

Item	1961		1960	
	Quantity	Value	Quantity	Value
Packaged products, fresh and frozen:				
Fish:	*Thousand pounds*	*Thousand dollars*	*Thousand pounds*	*Thousand dollars*
Not breaded:				
Fillets and steaks, raw	158,112	51,764	153,166	48,437
Other (includes whale meat for animal feeding)	7,472	1,533	6,166	1,262
Breaded, raw and cooked:				
Sticks	69,824	30,100	65,142	28,671
Fillets and portions	63,586	23,823	51,924	18,965
Shellfish:				
Not breaded	162,497	129,298	191,749	138,022
Breaded	88,699	66,453	84,221	57,412
Fish and shellfish specialties	32,834	23,887	31,852	23,043
Total fresh and frozen	583,024	326,858	584,220	315,812
Canned:				
Fish and shellfish for human consumption:				
Tuna	310,612	189,173	301,388	172,679
Salmon	177,443	116,955	136,049	88,197
Sardines:				
Maine (sea herring)	17,635	7,560	46,744	16,700
Pacific	18,859	3,664	27,714	4,659
Mackerel	62,026	8,529	42,064	5,804
Clam products and specialties	52,581	16,520	44,956	14,183
Shrimp and specialties	9,573	11,862	14,469	17,294
Oysters and specialties	13,026	7,853	11,783	7,315
Squid	5,510	567	751	74
Other	41,441	20,126	33,091	15,842
Total for human consumption	708,706	382,809	659,009	342,747
Bait and animal food:				
Animal food	333,349	39,072	421,772	43,979
Salmon eggs for bait	684	955	718	869
Total bait and animal food	334,033	40,027	422,490	44,848
Total canned	1,042,739	422,836	1,081,499	387,595
Cured fish and shellfish:				
Salted	39,612	17,687	34,760	14,104
Smoked	33,044	33,551	31,512	27,557
Dried fish and shellfish, and lutefisk (from dried cod)	1,797	1,158	2,047	1,184
Total cured	74,453	52,396	68,319	42,845
Industrial products				
Meal and scrap	622,530	31,940	580,274	25,282
Oil, body and liver	258,118	14,373	209,143	13,386
Fish solubles and homogenized-condensed fish	224,508	5,469	197,858	4,021
Oyster shell lime and poultry grit	885,670	6,342	941,650	6,821
Marine pearl shell and mussel shell buttons	[1] 1,842	3,020	[1] 1,949	3,253
Other		13,425		13,832
Total industrial products		74,569		66,595
Grand total		876,659		812,847

[1] Number of gross.

A–4.—*Foreign trade in fishery products, by quantity and value, calendar years 1961 and 1960*

Item	1961		1960	
	Quantity	Value	Quantity	Value
Imports:				
Edible:				
Fresh or frozen:	*Thousand pounds*	*Thousand dollars*	*Thousand pounds*	*Thousand dollars*
Fresh-water (not fillets)	41,070	14,253	39,655	13,865
Salt-water (not fillets)	310,877	49,874	384,654	53,140
Groundfish and ocean perch fillets	195,099	42,595	155,550	33,265
Other fillets	67,167	23,593	61,713	20,955
Shrimp	126,268	68,538	113,418	56,406
Lobsters:				
Common	21,299	14,571	21,403	14,018
Spiny	32,610	34,468	32,346	30,750
Other shellfish	16,715	5,949	14,616	5,534
Canned:				
Salmon	7,167	3,545	19,113	7,541
Sardines	42,488	12,543	27,377	9,115
Tuna	58,663	22,175	51,755	19,142
Crabmeat	4,237	5,780	4,507	5,514
Other	53,813	22,309	52,185	21,306
Cured, dried, pickled, or salted	77,480	13,703	81,873	14,890
Smoked or kippered	4,626	1,137	4,795	1,104
Other	2,083	724	2,500	835
Total edible	1,061,662	335,757	1,067,460	307,380
Nonedible:				
Fish and marine animal oils	[1] 10,102	8,475	[1] 7,378	6,717
Fish meal and scrap	[2] 218	16,740	[2] 132	11,068
Other		36,086		34,900
Total nonedible		61,301		52,685
Grand total, imports		397,058		360,065
Exports:				
Edible:				
Fresh or frozen	11,558	6,348	12,765	5,952
Canned:				
Mackerel	3,908	581	1,305	211
Salmon	7,186	5,580	11,924	9,830
Sardines	7,660	1,397	21,219	3,508
Other	8,296	4,573	12,630	5,161
Total canned	27,050	12,131	47,078	18,710
Cured	976	756	1,061	701
Other	553	359	550	259
Total edible	40,137	19,594	61,454	25,622
Nonedible:				
Fish and marine animal oil	122,486	8,908	143,659	10,688
Other		6,208		7,855
Total Nonedible		15,116		18,543
Grand total, exports		34,710		44,165

[1] In thousand gallons.
[2] In thousand tons.

Appendix B—New Legislation

Fishing Vessels; Transfer and Transportation of Catch of Other Vessels

46 U.S.C., 1958 Ed., Supp. III, 404a

Legalizes the transfer of the catch of one fishing vessel to another on the high seas and the transportation of it without charge to a port of the United States.

75 Stat. 410–411; Public Law 87–177; Act of August 30, 1961.

Shellfisheries Research Center; Establishment; Purpose

16 U.S.C., 1958 Ed., Supp. III, 760h–760i

Authorizes the Secretary to construct a research center for shellfish production at Milford, Conn., and to acquire such real property as necessary. The purpose for the research center is to conduct research on physiology and ecology of commercial shellfish, develop hatchery methods for cultivation of mollusks, and train persons in the most advanced methods of shellfish culture.

75 Stat. 409; Public Law 87–173; Act of August 30, 1961.

Management and Disposition of Vessels and Other Property Acquired and Arising Out of Fishery Loans

16 U.S.C., 1958 Ed., Supp. III, 742k

Empowers the Secretary to dispose of vessels and property acquired through foreclosure under the fishery loan program; to complete, recondition, reconstruct, renovate, repair, maintain, operate, charter, assign, or sell upon such terms and conditions as he may deem most advantageous to the United States.

75 Stat. 493; Public Law 87–219; Act of September 13, 1961.

Landing of Catches of Fish from Foreign-Flag Vessels in the Virgin Islands

46 U.S.C., 1958 Ed., Supp. III, 251, 251a, 251b

Permits fish catches of small foreign-flag boats to be landed in the Virgin Islands as long as the landings are for immediate consumption. Sale of the landings to any agent, representative, or employee of a freezer or cannery is prohibited in the absence of satisfactory evidence that such sale or transfer is for immediate consumption.

75 Stat. 493; Public Law 87–220; Act of September 13, 1961.

Appendix C—Fisheries Loan Fund

C–1.—*Status of fisheries loan fund, June 30, 1961*

Funds appropriated		$13,000,000
Principal collected	$3,060,000	
Interest collected and accrued	818,000	
Total collected		3,878,000
Total		16,878,000
All expenses to end of fiscal year 1961	685,784	
Limit on expenses fiscal year 1961	250,000	
Loans approved	10,239,134	
Total		11,174,918
Balance		5,703,082

C–2.—*Cumulative totals, fiscal years 1960 and 1961, and totals, fiscal year 1961*

	Cumulative total				Total	
	As of June 30, 1960		As of June 30, 1961		Fiscal year 1961	
	Number	*Amount*	*Number*	*Amount*	*Number*	*Amount*
Applications received	777	$24,231,119	961	$28,949,169	184	$4,718,050
Applications approved	422	9,933,257	511	12,013,809	89	2,080,552
Applications declined	201	5,872,043	246	6,625,603	45	753,560
Applications ineligible	66	1,497,459	82	1,980,879	16	483,420
Being processed	22	1,622,687	32	1,961,455		

C–3.—*Cumulative totals, fiscal years 1960 and 1961, and totals, fiscal year 1961, by area*

	Cumulative total				Total	
	As of June 30, 1960		As of June 30, 1961		Fiscal year 1961	
Northeast:	*Number*	*Amount*	*Number*	*Amount*	*Number*	*Amount*
Applications received	235	$8,483,272	262	$9,073,666	27	$590,394
Applications approved	126	3,714,950	140	4,080,774	14	365,824
California:						
Applications received	120	7,744,104	145	9,306,083	25	1,561,979
Applications approved	67	2,878,626	82	3,828,573	15	949,947
Gulf:						
Applications received	156	4,415,503	223	5,932,983	67	1,517,480
Applications approved	62	1,593,390	82	1,980,288	20	386,898
Pacific Northwest:						
Applications received	142	2,550,675	166	3,101,506	24	550,831
Applications approved	86	1,198,965	104	1,440,912	18	241,947
Alaska:						
Applications received	90	632,735	119	887,498	19	254,763
Applications approved	63	400,600	83	527,136	20	126,536
Great Lakes:						
Applications received	21	245,341	28	332,025	7	86,684
Applications approved	8	58,420	8	58,420	0	0
Hawaii:						
Applications received	12	157,489	17	313,408	5	155,919
Applications approved	9	86,506	11	95,906	2	9,400
Puerto Rico:						
Applications received	1	2,000	1	2,000	0	0
Applications approved	1	1,800	1	1,800	0	0

C–4.—*Authorized use of loan proceeds, percentage by area*

(From beginning of program through fiscal year 1961)

	Debt payment	Improvements	Other
	Percent	*Percent*	*Percent*
New England and Middle Atlantic	55	43	2
South Atlantic and Gulf	65	32	3
California	37	58	5
Pacific Northwest	30	68	2
Great Lakes	13	87	0
Alaska	30	69	1
Hawaii and Puerto Rico	38	52	10
Total	47	50	3

C–5.—*Number of loan applications received monthly, fiscal years 1957–61*

	1957	1958	1959	1960	1961
July		17	9	15	8
August		17	12	13	10
September		14	10	9	7
October		12	7	16	6
November		18	13	9	19
December	88	11	13	15	21
January	16	14	10	16	18
February	41	18	12	27	26
March	40	22	15	28	13
April	22	22	14	13	18
May	28	11	10	19	31
June	30	9	12	10	7
Total	265	185	137	190	184

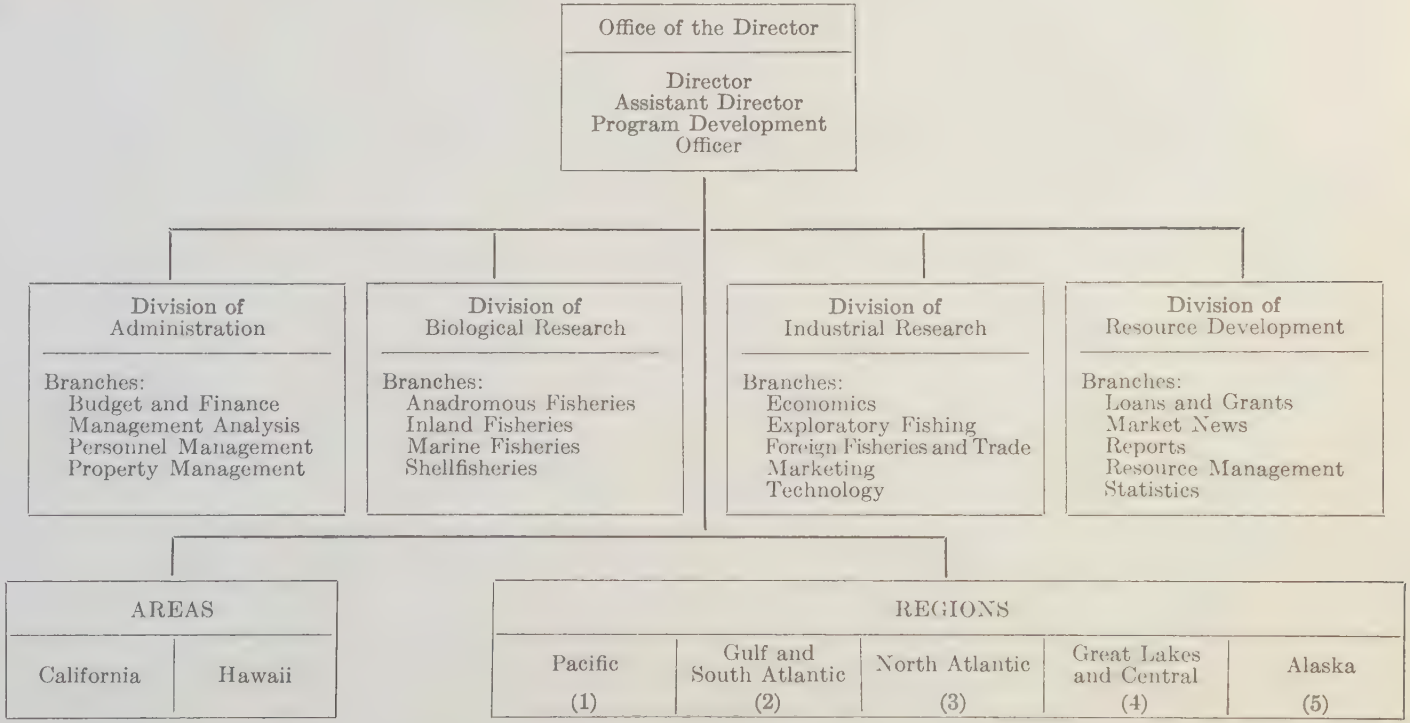
C–6.—*Amounts applied for monthly, fiscal years 1957–61*

	1957	1958	1959	1960	1961
July		$274,524	$251,571	$830,182	$134,196
August		931,110	363,000	234,465	275,972
September		607,851	385,517	465,610	176,781
October		204,635	62,532	305,150	195,095
November		375,583	153,559	124,905	428,011
December	$2,533,020	160,670	331,502	198,161	425,076
January	377,485	520,323	153,501	344,197	203,752
February	1,458,748	305,318	115,000	554,425	665,798
March	2,563,703	862,325	185,069	698,063	692,766
April	629,131	336,888	189,871	226,542	426,453
May	2,276,774	642,025	185,869	1,003,874	877,990
June	948,437	224,652	291,980	343,372	216,160
Total	10,787,298	5,445,904	2,668,971	5,328,946	4,718,050

Appendix D—Organizations With Which the Bureau Had Contracts in 1961

Organization	*Location*
A. C. I. Productions	New York, N.Y.
Alaska Department of Education	Juneau, Alaska
Alaska Department of Fish and Game	Juneau, Alaska
Barkley and Dexter Laboratories, Inc	Fitchburg, Mass.
Boston College	Boston, Mass.
California Department of Fish and Game	Sacramento, Calif.
California, University of	Davis, Calif.
Connecticut, University of	Storrs, Conn.
Delaware, University of	Newark, Del.
Duke University	Durham, N.C.
F. Mansfield and Sons Company	New Haven, Conn.
Florida State Board of Conservation	Tallahassee, Fla.
Florida, University of	Gainesville, Fla.
Great Lakes Fishery Commission	Ann Arbor, Mich.
Harvard University	Cambridge, Mass.
Idaho Department of Fish and Game	Boise, Idaho
Louisiana Wild Life and Fisheries Commission	New Orleans, La.
Mayo Association	Rochester, Minn.
Maine Department of Sea and Shore Fisheries	Augusta, Maine
Maryland Department of Tidewater Fisheries and National Resources Institute.	Annapolis, Md.
Maryland, University of	College Park, Md.
Miami, University of	Miami, Fla.
Minnesota, University of	Minneapolis, Minn.
Minnesota, University of (Hormel Institute)	Austin, Minn.
National Fisheries Institute	Washington, D.C.
New Hampshire, University of	Durham, N.H.
North Carolina, University of	Chapel Hill, N.C.
Oregon Fish Commission	Portland, Oreg.
Oregon State Game Commission	Portland, Oreg.
Oregon State College	Corvallis, Oreg.
Pennsylvania State University	University Park, Pa.
Reed Research, Inc	Washington, D.C.
Refrigeration Research Foundation	Colorado Springs, Colo.
Rhode Island, University of	Kingston, R.I.
Rutgers University	New Brunswick, N.J.
Scripps Institution of Oceanography	La Jolla, Calif.
United States Testing Company	Hoboken, N.J.
Washington State Department of Fisheries	Seattle, Wash.
Washington State Department of Game	Seattle, Wash.
Washington, University of	Seattle, Wash.
Washington, University of (Fisheries Research Institute).	Seattle, Wash.
Woods Hole Oceanographic Institution	Woods Hole, Mass.

Appendix E—Organization Chart



Appendix F—Budget for Fiscal Year 1961

Function	Appropriations							Transferred funds, Corps of Engineers		Contributed funds	Reimbursements	Total
	Management and investigations of resources	Construction	Construction of fishing vessels	General administrative expenses	Administration of Pribilof Islands	Payment to Alaska	Promote and develop fisheries [1]	Operation and maintenance	Construction			
Management	$369,000										$22,541	$391,541
Marketing and technology	2,404,000						$1,929,600			$366,225	209,556	4,909,381
Research	4,799,000						2,815,000			826,462	498,992	8,939,454
Research on fish migration over dams	303,000						350,000				85,603	738,603
Fishing vessel mortgage insurance	51,000											51,000
Columbia River fishery facilities								$1,849,800	$1,368,100		4,206	3,222,106
Construction of fishery facilities		$2,400,000										2,400,000
Construction of fishing vessels			$750,000									750,000
General administrative services				$385,000			314,400	$65,200	31,900	31,967	21,028	849,495
Administration of Pribilof Islands					$1,876,400						22,796	1,899,196
Fur seal research					222,600						1,299	223,899
Payment to Alaska from Pribilof Islands receipts						$1,050,002						1,050,002
Fisheries Advisory Committee							31,600					31,600
Total	7,926,000	2,400,000	750,000	385,000	2,099,000	1,050,002	5,440,600	1,915,000	1,400,000	[2] 1,224,654	[3] 866,021	25,456,277

[1] Funds made available under Public Law 466, 83d Cong. (known as the Saltonstall-Kennedy Act of 1954).

[2] Includes $818,700 from Great Lakes Fishery Commission, $364,000 for inspection and grading of fishery products, and $16,000 from Marine Research Committee of California.

[3] Reimbursements include funds from the following: $67,000 CIA; $189,000 AEC; $267,100 Bureau of Sport Fisheries and Wildlife; $157,500 Corps of Engineers.

Appendix G—Physical Properties

G–1.—*Principal laboratories and installations, calendar year 1961*

Location	Type	Principal use	Gross valuation [1]
Alaska			
Auke Bay	Biological Laboratory	Biological research	$405,647
Juneau	Exploratory Fishing and Gear Research Base, warehouse and shops.	Exploratory fishing and gear research, vessel maintenance, loans and grants.	[2] 436,000
Ketchikan	Technological Laboratory	Technological research	195,000
Pribilof Islands	Fur seal processing facilities and native villages.	Management of Alaska fur seals.	2,912,000
California:			
Lajolla	Biological Laboratory	Biological research	[3]
San Diego	do	do	[3]
Stanford	do	do	[3]
Connecticut, Milford	do	do	91,000
District of Columbia:			
Navy Yard Annex	do	do	[3]
U.S. National Museum.	Ichthyological Laboratory	do	[3]
Florida:			
Gulf Breeze	Biological Laboratory	do	63,000
St. Petersburg Beach	Office of Loans and Grants	Loans and grants	[3]
Georgia, Brunswick	Biological Laboratory	Biological research	[3]
Hawaii, Honolulu	do	Biological research, loans and grants, statistics.	314,000
Maine, Boothbay Harbor	do	Biological research	[2] 140,000
Maryland:			
College Park	Technological Laboratory	Technological research, home economics.	83,000
Oxford	Biological Laboratory	Biological research, statistics	179,000
Massachusetts:			
Boston	Office of Loans & Grants	Loans and grants	[3]
Gloucester	Technological Laboratory	Technological research, fishery products inspection.	320,000
Gloucester	Exploratory Fishing and Gear Research Base.	Exploratory fishing and gear research.	55,000
Woods Hole	Biological Laboratory	Biological research	1,029,000
Michigan, Ann Arbor	Biological Laboratory, Technological Station, Exploratory Fishing and Gear Research Station.	Biological and technological research, exploratory fishing and gear research, market development, statistics.	[3]
Mississippi, Pascagoula	Exploratory Fishing and Gear Research Base, Technological Laboratory.	Exploratory fishing and gear research, market development, biological and technological research.	86,000
North Carolina, Beaufort	Biological Laboratory	Biological research, statistics	201,000
Texas, Galveston	do	Biological research	295,000
Washington, Seattle	Biological Laboratories (3), Technological Laboratory, Exploratory Fishing and Gear Research Base, dock and warehouse.	Biological and technological research, exploratory fishing and gear research, Pribilof Islands supply, fishery products inspection.	[2] 142,000
Puerto Rico, Mayaguez	Technological Laboratory	On loan to University of Puerto Rico.	27,000

[1] Figures shown are orignial acquisition or construction costs.
[2] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.
[3] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.

G–2.—*Minor field research stations, market news offices, exploratory fishing stations, market development offices, and statistical offices, calendar year 1961*

Location	Type	Principal use	Gross valuation [1]
Alabama, Bayou LaBatre	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Alaska:			
Brooks Lake	Field Research Station	Biological research	$21,000
Juneau	Statistical Field Office	Statistics	(3)
Karluk Lake	Field Research Station	Biological research	27,000
Kasitsna Bay	do	do	12,000
Little Port Walter	do	do	158,000
Olsen Bay	do	do	7,500
St. Paul Island	do	do	
Traitors Cove	do	do	8,000
Arkansas, Dumas	Marketing Office	Marketing	(2)
California:			
Mill Creek	Field Research Station	Biological research	29,000
San Pedro	Market News and Statistics Office.	Market news and statistics reporting.	(2)
San Francisco	Marketing Office	Marketing	(2)
Terminal Island	Marketing Office and Technological Station.	Technological research, fishery products inspection.	(2)
Florida:			
Apalachicola	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Fort Meyers	do	do	(2)
Green Cove Springs	Field Research Station	Biological research	(2)
Key West	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Miami	Statistical Field Office	Statistics and biological research.	(2)
Panama City	Exploratory Fishing and Gear Research Station.	Exploratory fishing and gear research.	(2)
St. Petersburg Beach	Field Research Station and Fishery Products Inspection Office.	Biology research, fishery products inspection, marketing.	(2)
Tampa	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Georgia:			
Atlanta	Marketing Office	Marketing	(2)
Brunswick	Statistical Field Office, Exploratory Fishing and Gear Research Station.	Statistics, exploratory fishing and gear research.	(2)
Illinois:			
Chicago	Market News Office, Fishery Products Inspection Office.	Market news reporting, fishery products inspection.	(2)
Chicago	Marketing Office	Marketing	(2)
Louisiana:			
Empire	Statistical Field Office	Statistics	(2)
Houma	Statistical and Market News Field Office.	Statistics and market news reporting.	(2)
Morgan City	do	do	(2)
New Orleans	Market News Office, Statistical Field Office.	Market news reporting, statistics.	(2)
Port Sulphur	Statistical Field Office	Statistics	(2)
Maine:			
Portland	Field Office	Statistics, market news, biological research.	(2)
Rockland	do	do	(2)
West Boothbay Harbor	Statistical Field Office	Statistics	(2)
Maryland:			
Baltimore	Market News Office, Marketing.	Market news reporting, marketing.	(2)
Salisbury	Statistical Field Office	Statistics	(2)
Massachusetts:			
Boston	Market News Office, Marketing.	Market news reporting, statistics, biological and technological research, marketing.	(2)
Gloucester	Field Offices	Statistics, biological research, market news, fishery products inspection.	
New Bedford	Field Office	Statistics, biological research, market news reporting.	(2)
Provincetown	Statistical Field Office	Statistics, market news reporting.	(2)
Michigan:			
Hammond Bay	Field Research Station	Biological research	(2)
Ludington	do	do	(2)
Marquette	do	do	(2)
Northville	do	do	(2)

See footnotes at end of table.

G 2. *Minor field research stations, market news offices, exploratory fishing stations, market development offices, and statistical offices, calendar year 1961*—Continued

Location	Type	Principal use	Gross valuation [1]
Mississippi:			
Ocean Springs	Statistical Field Office	Statistics and market news reporting.	(2)
Pascagoula	Field Research Station	Biological research, marketing.	(2)
Missouri, St. Louis	Marketing Office	Marketing	(2)
New Jersey, Toms River	Statistical Field Office	Statistics	(2)
New York:			
Bayport	do	do	(2)
New York City	Market News Office, Marketing, Fishery Products Inspection Office.	Market news reporting, marketing, fishery products inspection.	(2)
Ohio:			
Cleveland	Marketing Office	Marketing	(2)
Sandusky	Field Research Station	Biological research	(2)
Oregon, Portland	do	do	(2)
Rhode Island:			
Point Judith	Field Station	Statistics, biological research	(2)
Warren	Statistical Field Office	Statistics	(2)
South Carolina, Charleston	do	do	(2)
Texas:			
Aransas Pass	Market News and Statistical Field Office.	Statistics and market news	(2)
Brownsville	Market News and Statistical Field Office, Fishery Products Inspection Office.	Statistics and market news, fishery products inspection.	(2)
Dallas	Marketing Office	Marketing	(2)
Freeport	Statistical Field Office	Statistics	(2)
Galveston	Market News and Statistical Field Office.	Statistics and market news	(2)
Port Arthur	do	do	(2)
Port Isabel	do	do	(2)
Virginia:			
Franklin City	Field Research Station	Biological research	(2)
Hampton	Market News Office	Market news reporting	(2)
Portsmouth	Statistical Field Office	Statistics	(2)
Weems	do	do	(2)
Washington:			
North Bonneville	Field Research Station	Biological research	(2)
Seattle	Market News and Statistical Office.	Market news reporting, statistics, loans and grants.	(2)
Seattle	Marketing Office	Marketing	(2)
Wisconsin:			
Ashland	Field Research Station	Biological research	(2)
La Crosse	Statistical Field Office	Statistics	(2)

[1] Figures shown are original acquisition or construction costs.
[2] Installation not owned by Bureau of Commercial Fisheries. Includes property held under leases, cooperative agreements, and use permits.
[3] Installations at this location are both owned and leased by Bureau of Commercial Fisheries.

G–3.—*Bureau of Commerical Fisheries vessel fleet, calendar year 1961*

Name	Home Port	Length	Year built	Cost	Horse-power	Mission
Black Douglas	San Diego, Calif.	152	1926	$75,000	325	Biology, distribution, spawning of the Pacific sardine; abundance and life history studies of other commercial species.
Penguin II	Seattle, Wash.	148	1943	533,532	875	Transportation of supplies and personnel to the Pribilof Islands fur seal stations.
Delaware	Gloucester, Mass.	147	1937	302,473	735	Exploratory fishing and biological studies on the ground fishes and sea scallops; gear research.
Hugh M. Smith.	Terminal Island, Calif.	128	1945	150,000	500	Pacific oceanography (since 1959 on loan to University of California Scripps Institution of Oceanography).
Charles H. Gilbert.	Honolulu, Hawaii	123	1952	409,890	640	Pacific oceanography; tuna biology, behavior, and distribution.
Oregon	Pascagoula, Miss.	100	1950	300,000	600	Exploratory fishing for shrimp, tuna and other potentially commercial species; gear research.
Alaska	California	100	(1)	300,000	600	On loan to the California Department of Fish and Game.
John N. Cobb	Seattle, Wash.	93	1950	235,392	500	Exploratory fishing for pelagic and bottom fish, shrimp, and crabs; gear research.
Murre II	Juneau, Alaska	86	1943	64,000	115	Oceanographic studies in coastal waters of southeastern Alaska with limited use for servicing shore facilities.
John R. Manning.	Juneau, Alaska	86	1950	181,600	320	Bottom surveys for halibut; patrol work; observations on foreign fishing activities in Bering Sea.
Pelican	do	75	1930	50,200	500	On loan to the Washington Department of Fish and Game.
Geo. M. Bowers.	Panama City, Fla.	73	1956	93,800	210	Primarily gear research.
Kaho	Saugatuck, Mich.	65	1961	85,000		Exploratory fishing and gear research on industrial fishes, chubs, alewives, sheepshead, gizzard shad, and smelt.
T–19	South Carolina	64	1942	187,000		On loan to State of South Carolina.
Rorqual	Gloucester, Mass.	64	1941	187,000	230	Gear research and inshore exploration on herring and shellfish.
Q–91	North Carolina	60	1943	40,000		On loan to State of North Carolina.
Q–100	do	60	1943	40,000		Do.
Cisco	Saugatuck, Mich.	60	1950	85,000	175	Research on deepwater fish species, their distribution, abundance, and ecology; limnology.
Heron	Juneau, Alaska	58	1940	19,000	135	Salmon and herring research.
Musky II	Sandusky, Ohio	53	1931	3,666	170	Studies on warm-water fishes of Lake Erie; limnology; pollution studies.
Siscowet	Ashland, Wis.	52	1946	81,000	170	Research on deepwater fish species, their distribution, abundance, and ecology; limnology.
Shang Wheeler	Milford, Conn.	50	1951	45,840	140	Shellfish research; oyster and clam propagation; predator control.
Alosa	Oxford, Md.	48	1941	6,500	82	Shellfish research; oyster propagation and disease studies.
Kingfish	St. Petersburg Beach, Fla.	43	1954	24,500	150	Estuarine investigations.
J–3486	North Carolina	43	1942	28,000		On loan to State of North Carolina.
J–1110	Beaufort, N.C.	40	1934	15,000	200	Research on shellfish, striped bass, and other.
Phalarope II	Boothbay Harbor, Maine.	40	1932	8,000	225	Clam and herring studies.
Sockeye	King Salmon, Alaska.	40	1946	11,250	175	Salmon research work.

[1] Year vessel was built is unknown.

Appendix H—Fish and Wildlife Service Series and a 1961 List of Publications by Bureau Personnel

The regular, established series of the Fish and Wildlife Service in which Bureau of Commercial Fisheries publications appear are:

Fishery Bulletin.—Technical reports of scientific investigations of fishery biology. The Bulletin of the United States Fish Commission was begun in 1881; it became the Bulletin of the Bureau of Fisheries in 1904 and the Fishery Bulletin of the Fish and Wildlife Service in 1941. Through volume 46, separates were issued as Documents. (The last Document was No. 1103.) Beginning with volume 47 in 1931, each separate was issued as a numbered Bulletin. Fishery Bulletin Nos. 181 to 191 (333 p.) of volume 61 were issued in 1961. Bulletins are for sale by the Superintendent of Documents; they are distributed free to libraries and to a limited number of scientific cooperators.

Research Report.—Technical papers reporting the results of scientific investigations with emphasis on their practical application. Included are biological, technological, and economic subjects. These succeeded the Investigational Reports series. Only one dealing with Bureau of Commercial Fisheries projects was published in 1961 (No. 53, 39 p.). They are for sale by the Superintendent of Documents but are distributed free to libraries and to a limited number of cooperators.

Special Scientific Report—Fisheries.—Preliminary or progress reports and reports on scientific investigations of restricted scope. Established as Special Scientific Reports in 1940, Nos. 1 to 67 were issued from that date to 1949, when the new series, Special Scientific Report—Fisheries, with new serial numbering was started. In 1961 there were 26 (2,056 p.) of these reports published, No. 398 being the last. They are processed from typewritten text to speed publication and are distributed free to libraries and cooperators on a limited mailing list.

Commercial Fisheries Abstracts.—A monthly abstract of world literature (chiefly English language) on fishery technology. Volume 14 in 1961 had 12 issues (326 p.). They have free, but limited distribution.

Commercial Fisheries Review.—A monthly presentation of developments and news of domestic and foreign fishery industries and trends. Volume 23 in 1961 had 12 issues (1,417 p.). For sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Subscription price $5.50 a year; $2 additional for foreign mailing; single copies 60 cents each.

Circular.—Popular and semitechnical publications of general and regional interest intended to aid conservation and management. Fourteen circulars (812 p.) were issued in 1961. They are usually distributed to depository libraries.

Fishery Leaflet.—Popular information on fishery subjects intended primarily for use in correspondence. Thirty-two leaflets (491 p.) were published during the year. They are distributed free on request.

Statistical Digest.—Annual statistics with detailed tabulations relating to fishery production, manufacture, and commerce. These succeeded the Ad-

ministrative Report series. One (459 p.) was published in 1961. They are for sale by the Superintendent of Documents; some are distributed free on a limited mailing list.

Current Fishery Statistics.—Current statistical information on fishery production, manufacture, and domestic or foreign trade, issued monthly, quarterly, or annually, by States, regions, or larger units. In 1961 there were 235 monthly landing reports (811 p.) for 20 States; 25 monthly reports of manufactured products (121 p.); and 36 annual reports of sectional and State operating units, catch statistics, manufactured products, and foreign trade (304 p.).

Fishery Products Report.—Daily (5 times a week), monthly, and annual—data on landings, receipts, supplies, prices, imports, movements of fish and fish products in local areas; market conditions; fishery developments in the United States and foreign countries. Also special Market News data reports are issued sporadically. Seven Market News Service field offices prepare and mail these free reports. During 1961 the daily reports totaled 6,354 pages; the monthly and annual, 1,741 pages; and supplementary, 129 pages.

Miscellaneous papers.—Forty-one miscellaneous papers, totaling 535 pages, were issued.

Audiovisual material.—In addition to the regular series of publications, the Bureau also produced one 16 mm. sound color motion picture. The film was *Fishing Five Great Lakes.*

A detailed list of publications of the Bureau of Commercial Fisheries and its personnel or contractors during 1961 follows. The articles are listed by authors.

Publications[1]

Abrahamson, John D.

Economic aspects of markets for Middle Atlantic oysters. Proceedings of the Gulf and Caribbean Fisheries Institute, Thirteenth Annual Session, November 1960, p. 128–131.

Abrahamson, John D., and Carl P. Hoffman, Jr.

Exempt trucking of fresh and frozen fish and shellfish in interstate commerce. U.S. Fish and Wildlife Service, Circular 133, iv+55 p.

Ahlstrom, Elbert H.

Distribution and relative abundance of rockfish (*Sebastodes* spp.) larvae off California and Baja California. Conseil Permanent Internationl pour l'Exploration de la Mer, Rapports et Procès-Verbaux des Réunions, vol. 150, p. 169–176.

Albano, G. A.

Receipts and prices of fresh and frozen fishery products at Chicago, 1960. U.S. Fish and Wildlife Service, Chicago Market News Service, 67 p.

Alverson, Dayton L.

Fishing vessels around the world. United States Naval Institute Proceedings, vol. 87, no. 1, p. 98–109.

Ocean temperatures and their relation to albacore tuna (*Thunnus germo*) distribution in waters off the coasts of Oregon, Washington and British Columbia. Journal of the Fisheries Research Board of Canada, vol. 18, no. 6, p. 1145–1152.

[1] This list does not include Commercial Fisheries Abstracts, Current Fishery Statistics, and Commercial Fisheries Review, except a few articles for which the authors' names are given.

Alverson, Dayton L.—Continued
Pacific coast groundfish. Western Fisheries, vol. 62, no. 3, p. 11–14, 53–57.
Un grand petit bateau (a grand little boat). France Pêche, vol. 2, 50 NF No. 47, p. 21–23.

Alverson, Dayton L., and Sigurd J. Westrheim.
A review of the taxonomy and biology of the Pacific ocean perch and its fishery. Conseil Permanent International pour l'Exploration de la Mer, Rapports et Procès-Verbaux des Réunions, vol. 150, p. 12–27.

Anderson, William W., Joseph E. Moore, and Herbert R. Gordy.
Oceanic salinities off the South Atlantic coast of the United States, *Theodore N. Gill* cruises 1–9, 1953–54. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 389, v+207 p.
Water temperatures off the South Atlantic coast of the United States, *Theodore N. Gill* cruises 1–9, 1953–54. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 380. v+206 p.

Applegate, Vernon C.
Downstream movement of lampreys and fishes in the Carp Lake River, Michigan. U.S. Fish and Wildlife Service, Special Scientific Report—Fisheries No. 387, iv+71 p.

Applegate, Vernon C., John H. Howell, James W. Moffett, B. G. H. Johnson, and Manning A. Smith.
Use of 3-trifluormethyl-4-nitrophenol as a selective sea lamprey larvicide. Great Lakes Fishery Commission, Technical Report No. 1, 35 p.

Barkley, Richard A., and Thomas S. Austin.
Distribution of properties about the equatorial undercurrent. [Abstract.] Tenth Pacific Science Congress of the Pacific Science Association, Honolulu, Hawaii, 1961, Abstracts of Symposium Papers, p. 339–340.

Barrett, Izadore, and Gerald V. Howard.
Studies of the age, growth, sexual maturity and spawning of populations of Anchoveta (*Cetengraulis mysticetus*) of the coast of the eastern tropical Pacific Ocean. *In* Inter-American Tropical Tuna Commission, Bulletin, vol. 5, no. 2, ii+p. 115–216.

Bates, Daniel W., and Stanley G. Jewett, Jr.
Louver efficiency in deflecting downstream migrant steelhead. Transactions of the American Fisheries Society, vol. 90, no. 3, p. 336–337.

Beeton, Alfred M.
Environmental changes in Lake Erie. Transactions of the American Fisheries Society, vol. 90, no. 2, p. 153–159.

Beeton, Alfred M., and Frank F. Hooper.
The hydrography of Saginaw Bay. [Abstract.] Proceedings of the Fourth Conference on Great Lakes Research, April 17–18, 1961, p. 111. Great Lakes Research Division, Publication No. 7. Institute of Science and Technology, University of Michigan, Ann Arbor, Mich.

Berry, Frederick H.
Review of *Studies on the eggs, larvae and juveniles of Japanese fishes, Series I*, by Keitaro Uchida and others. Copeia, 1961, no. 4, p. 508.

Berry, Frederick H., and William W. Anderson.
Stargazer fishes from the western North Atlantic (family Uranoscopidae). Proceedings of the United States National Museum, vol. 112, no. 3448, p. 563–586.

Berry, Frederick H., and Max Poll.
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